NATURE MAGAZINE
VOLUME 32 · MARCH · 1939 · NUMBER 3

Winning Through

By E. CHESLEY ALLEN

Illustrated by R. Bruce Horsfall

MEMORY, that faithful valet of the mind, ever attends upon the lover of the outdoors, ready to place before him the garnered jewels of past experiences; and these treasures are often produced at times when they are least expected.

Just now, a night in mid-winter, the wind is howling about my window, sleet is slapping viciously against the panes, and that peculiar sound, between a tinkling and a creaking, from the elms and lindens along the road tells me that they are taking on a burden of clear ice, beautiful but dangerous. But in my comfortable chair, and without once stroking a lamp, I suddenly find myself back to a day in August.

It has been several years—too long, in fact—since E. Chesley Allen has been represented in our pages. A discerning naturalist, he also possesses the rare faculty of telling a beautiful story of Nature as he knows her.

My chair has been transformed into a mossy stone in the shadow of an old stone wall. Before me is a little brook tumbling down the hillside and becoming quieter as it zig-zags through a strip of meadow and enters a reedy pond. From somewhere up the wooded slope behind me comes the echoing call of an ovenbird; and, in the intervals, the drawling whistle of a wood-pewee voicing the spirit of the lazy August afternoon. A pair of goldfinches, tardy, late-summer house-keepers, are carrying food to their family of nestlings in a thorn at the edge of the meadow. Swallows skim the tops of the water weeds along the edge of the pond, or, higher up in mid-air, the older birds meet and feed their young with marvellous dexterity. Along the banks of the little brook the bushy tangle is alive with sparrows and warblers, and a Maryland yellow-throat peeps at me for a moment through his black mask and suddenly breaks into the theme song of the whole scene: "Witchery! Witchery! Witchery!"

A little observation discovers the reason for this abundant bird life; here is abundant insect life as well. Damsel flies, with slender bodies enamelled in blue, green, and black, weave to and fro on iridescent wings or rest horizontally upon the long blue spikes of pickerel-weed. If I walk through the meadow grass I disturb myriads of tiny frog-hoppers, those pert little toad-like insects that, only a few weeks ago, were encased in their masses of froth clinging to countless grass-stems. Or my feet disturb scores of little close-wing moths that flutter ahead a few feet and come to rest with their wings folded tightly about them, or, if too closely pressed, nose-dive down into the tangle of grass-roots and play 'possum most successfully. Large grasshoppers, disturbed by my progress, prove the efficiency of their giant leg muscles and kick off to safety; but, over a strip of hot gravel by the pond, large gray grasshoppers rise into mid-air and crackle entrancingly in the shimmering heat. On a group of purple thistles several butterflies, sulphurs and silver-spots, pause to uncoil their long spiral tongues and thrust them down into each deep-throated floret. A few clumps of goldenrod and early aster are already in flower, and are keeping open house to small solitary bees and wasps of many species; and a patch of fire weed is the mecca of honey-bees from an apiary half a mile away. They are working assiduously the few flowers of each rosy spike that have nectar for the taking, and a beautifully clear honey it will make. Already the fine-spun rattle of the cricket comes from a miniature cave under a loose stone. Over and above all, from a high perch at the top of a dead maple, comes the high-pitched, shrill note of a cicada, or "harvest-fly," revelling in the heat.

But suddenly the whole picture is shattered. A sudden, more insistent dash of sleet against my window brings me rudely back from August to winter and to a serious consideration of how these many forms of insect life fared when the first sharp frosts of autumn turned to russet the green brakes along the edges of the clearings, edged with fairy crystals the new-fallen leaves of crimson and gold, and sent stealthy fingers of ice out from the shore of the little pond. What provision did they make, either for

themselves or for the next generation, so that each species that has come down to us through untold generations might bridge this hostile gap that we call winter, and go on through equally untold generations and eons of time?

Those honey bees that we watched through the spring, summer, and autumn, so faithfully working at the whole range of flowers, starting with the early willows, then taking the dandelions, maples, blueberries, and clovers, the fireweed, and finally the star thistles, asters, and goldenrods —where are they? In truth, most of them are dead; for their busy lives had run their course and were sacrificed to the perpetuation of the race. As they fell by the way, wing-tattered and overcome, hundreds of newly-emerged bees appeared in the hive daily; so that, when the last autumn flowers were killed by the frosts, the hive was well filled, not only with honey and pollen paste, but by a generation of thousands of young, active bees whose mission it is to carry the life of the hive as a whole through to the appearance of the first golden willow flowers next spring. Just how, in their tight, but mobile winter cluster within the hive, feeding upon their winter stores, ever changing places with each other from centre to surface, and from surface to centre, and keeping the temperature of the colony above the danger point, is an epic of constancy and cooperation.

"LAST SEASON WE SAW THEM IN THE CLOVER TOPS"

But, in comparison with these thrifty and efficient little citizens, their relatives, the bumblebees, measure very poorly indeed. Last season we saw them in the clover tops, at the centres of the wild roses, creeping into the mouths of monkshood and foxglove, and in a score of other places; but they seemed to go about their work in a grumbling, mumbling manner. In late summer I got a peep into their housekeeping affairs, taking my cue from a black-and-yellow furry body disappearing into the side of an old neglected hay-stack. Here, a few inches beneath the surface, I found a rough cavity not as large as my fist and containing less than a score of rough cells, not at all like the geometrical hexagons of the honey-bee, but poorly constructed and varying in size. Some held larvae, and others a small quantity of very poor honey, certainly not enough to tide over even a few days of bad weather. The advent of winter and the cutting off of supplies from the field could have but one result. The colony is wiped out, except a small number of queens who find individual hiding-places, and, if the fates be kind, come forth the following spring prepared to lay the eggs that are to produce other bumblebee families.

The same story might be told of the black-and-white hornets or the yellow-jacket wasps with their frail paper houses; but one must admit that their cell-building is much neater, and they do not even make a pretence, as do the bumblebees, of storing honey for the future.

Those butterfly visitors upon the thistle heads, silver-spots, sulphurs, angle-wings and others—how are their tribes faring on a night like this? Their light and apparently trivial flutterings from flower to flower, with sips of nectar here and there, showed only the more frivolous aspect of lives whose great and dominant purpose is the perpetuation of the species. For, before winter could lay its chilling and deadening hand upon them, sulphur caterpillars must hang themselves by their tails in appropriate shelters, spin a supporting band of silk, doff their green coats and prepare to sleep through as angular chrysalides; minute silver-spot larvae, recently hatched from tiny eggs, must find shelters; and full-fledged angle-wing butterflies must seek retreats in hollow trees, under loose bark or even in our human habitations. Why the sulphurs should pass the winter in the pupa state, the silver-spots as larvae, and the angle-wings as mature insects is as great a mystery as why the first demands the foliage of clover or other legumes for its larvae, the second must have the leaves of violets, and the last definite selections of other plants. It all leaves us very humble in the conviction of how little we know.

What became of that high-voiced cicada that sang so joyously during the hot days of July and August? His voice is stilled, but the song was not in vain, for it was

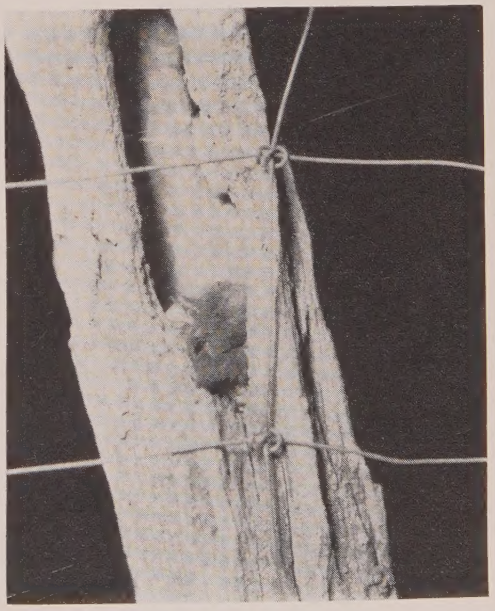
"FROM SOMEWHERE UP THE WOODED SLOPE BEHIND ME COMES THE ECHOING CALL OF AN OVENBIRD . . ."

heard on the far side of the clearing by a mate who sought and found the minstrel. Her eggs were laid in slits that she made in the tender bark of young twigs. The young hatched, found their way to the ground, and burrowed in. Here they will live for two years feeding upon tender roots; but, when the second summer comes, each will obey the imperative call of Nature, dig its way out, and ascend to some elevation on tree or shrub. Clumsy and wingless it is now, and not at all like the bright, metallic musician that serenaded us from the tree-tops. But wait. Presently the ungainly creature clinging to the bark becomes strangely agitated. It takes a firmer hold of its support and, after many and varied exertions, the soil-stained armor splits along the back, and out crawls a pale creature, weak from its efforts. But soon the pale surface of the newly-emerged body darkens and hardens into a coat of burnished mail, the wings lengthen and stiffen, and our cicada will soon be sending forth strident calls for a mate, or laying the eggs that will produce the cicadas of two years hence.

And those gray grasshoppers that rose and crackled before us in mid-air above the gravelly beach. What became of them and their green-armored relatives of the grass-fields and pastures? Last autumn I came upon a female grasshopper on a bit of open ground. The rear end of her body was bent downward and into the soil, and, as I watched, it penetrated deeper and deeper. Those four hard, sharp points at its end were showing their value as digging instruments. When it had penetrated as deeply as its length would allow, a little pocket of eggs would be left at the bottom of the pit, the abdomen would be withdrawn and the eggs left to the fates of weather and possible enemies. So, though the autumn frosts might still the castanets of the insect orchestra, it would not be before provision was made for next year's performers.

WREN FACTS

By GRACE WHEAT



A PAIR of house wrens nested for two summers in a little box, five by seven inches with one-inch entrance, set upon a shelf attached to the front of our house. The first year they raised two broods of six babies each. Next year the first brood was six and the second setting of eggs was eight, of which seven hatched and six flew away. Each time, on the first night out of the nest, the mother took her babies to a hollow fence post across the road from the house. She teased and scolded them to get them there, using a juicy worm as bait. For several nights, after the young had left the box, one of them returned to sleep on the shelf where the nesting box rested, homesick, perhaps.

HORNED ROYALTY OF SOUTH AFRICA

By A. J. MALLET-VEALE

Attending an auction one day at Salisbury, Southern Rhodesia, Mr. and Mrs. Mallet-Veale bid successfully on an odd lot of pictures. They were interested in the frames, for Mrs. Mallet-Veale is an artist. When they examined their purchase they found it included ten beautifully-drawn pen and ink sketches of different species of South African antelopes. There was no clue to the identity of the artist beyond the signature, AR, and the date, 1909. Having been a pioneer in Southern Rhodesia, and among those present when the Union Jack was hoisted at Fort Salisbury on September 12, 1890, Mr. Mallet-Veale has an acquaintance of long standing with the wild life of the region. He has drawn upon this experience to supply us with an article to accompany this interesting pictorial find.

SABLE ANTELOPE

ROAN ANTELOPE

OF ALL the varied and interesting wild life of South Africa, probably the various antelopes, most of which are loosely called "bucks," are the most widely known throughout the world. Many of them are to be found in zoological parks, where they are admired for their beauty, grace and the interesting variety of their horns. With the growth of conservation sentiment in South Africa and the setting aside of the great Kruger Park, there should always be an adequate number of these animals in their natural and native habitat.

One of the more common antelopes in South Africa is the duiker, which grows to be about the size of an Alsatian sheep dog, or German Shepherd. Its brownish-drab coat contrasts with its white belly. Its legs are notably slender, terminating in tiny black hoofs. In agricultural districts these little animals are often a nuisance, particularly enjoying a diet of green beans, potatoes or monkey nuts, and they will happily munch blossoms in the flower garden. They are, however, often made pets, and, if secured quite young, can be raised on a bottle and become attractive and affectionate companions.

SITATUNGA

REEBOK

KLIPSPRINGER

Not unlike the duiker in size and in some characteristics is the klipspringer. Its hair, however, resembles in color the quills of the porcupine, due to its mixture of white and dark shades. It is shy of human settlements and prefers the wild and mountainous country. Remarkably agile, the klipspringer will climb to precipitous heights and leap nimbly from rock to rock. It has distinctly inquisitive traits, and hunters report that if one of a herd—which usually numbers a half-dozen—is shot, the victim's companions will come back looking for it, often at the cost of their own lives.

The kudu is a noble antelope, quite plentiful in both Northern and Southern Rhodesia. It is noted for its magnificent corkscrew horns, sometimes measuring seventy-two inches along the ridge of the corkscrew twist. He wears a coat of dove-color, with lighter stripes across his saddle, and is slender and graceful. Bull kudus often measure seven feet in height. The female, unlike many of these antelopes, is hornless. Keen-sighted and fleet, this animal is often a farmland marauder, specializing in the blossoms of cotton and sunflowers.

A medium sized species, the boschbok—or bushbuck—is notable for its markings of spots and stripes showing up like a harness against a dark brown coat. It is common in the Rhodesias and in Portuguese East Africa, frequenting the thickish bush along rivers. It has a peculiar bark, much like that of a dog, and is an intrepid fighter, standing bravely against hunting dogs.

KUDU

GEMSBOK

BOSCHBOK

A large species is the roan antelope, the bull being as large as an average-sized bullock, and its build thicker and heavier than that of the kudu. It is a handsome and imposing animal, in color like a blue roan horse, its face black with a white muzzle and markings. Roaming in considerable herds, these animals rather avoid human habitations, and are particularly plentiful in Northern Rhodesia.

In both Rhodesias I have seen herds of the large sable antelopes numbering as many as eighty head. The bucks are black-coated with white bellies and white between the hind legs. This sharp contrast in color makes them conspicuous on the veldt. The females are dark brown with white stomachs and also carry good-sized horns. The horns of the bulls are larger than those of the roan antelope but similar in character. The skin of this species is much sought for its unusual toughness, which makes it valuable for whips and ox halters.

A farmer neighbor of mine once had a sable antelope that he had rescued from natives when it was a tiny calf. Growing up to answer to the name of Herbert, this animal became the family pet and would run behind my friend's bicycle in company with his dogs. When mature,

Herbert would still try to make forcible entry into the house to join the family, and finally became so strong and rough that it was necessary to dispense with him as a pet.

As its name suggests, the waterbuck frequents rivers and is rarely found far from water. It is about the size and color of a donkey, and the female, having no horns, much resembles one. In fact, I have known donkeys to be shot by mistake for this reason. However, one would never commit such an error if he approached the animal astern because the hind quarters of both male and female are marked with a white ring encircling the buttocks.

The reebok is a native of the southern part of the Cape Peninsula, and its close relative in Rhodesia is the reed buck, quite similar in size and habits. They are both smaller bucks with coats a lovely shade of tan brown, that of the reebok being slightly darker in tone. Travelling mostly in pairs, they are often a pest to the farmer. As a youngster on a Cape farm, I had a young reebok pet, tame and gentle. When nearly full grown it would travel with the cattle wherever the herd boy drove them. It came to a sad end when a Dutch hunter thought it wild.

A frequenter of rivers and swamps, the sitatunga is found in Northern Rhodesia. It is able to walk on the floating sod of these swamps because its cloven hoofs are wide open at the tips and enable the animal to hold to the thick vegetation. This antelope is much like a small-scale kudu. In fact, it is often mistaken for the lesser kudu, but its coat is darker in color and its hair coarser in texture. It is a timid animal and never found near human habitations. Its horns (borne only by the males) have a corkscrew twist, and are particularly beautiful because of their ivory-like tips. When hunted, this antelope will seek refuge in water, often immersing itself until only its nose remains above the surface.

WATERBUCK

DUIKER

The gemsbok is one of the larger antelopes, and is notable for its long, straight and sharp-pointed horns. The markings on its face are most striking, with patches of black and white in sharp contrast. It has also a black mane, and the tail and dividing line between the gray of back and the white of belly is also black. Gemsboks frequent the Transvaal-Rhodesian border region. They are courageous fighters and are known to have met lions in battle, using the horns with deadly effect.

As full as South Africa is of interesting wild life, extensive and indiscriminate hunting is no longer advisable. Protection is extended to many species, and the various splendid antelopes merit special consideration, since they constitute so characteristic a feature of the region.

White Woodchucks

By HENRY LAMBERT

ONE EARLY summer evening about five years ago, on our way to the Yellowstone River to fish, we were driving across a pasture when several woodchucks ran across our path to their holes. Among them was a small white one. The next morning we found a light trap that would not injure, and had this ghostly woodchuck within half an hour. We took her home to a six-foot cage that we could move around for fresh food.

We found that our guest liked cake, bread, cherries and strawberries as well as grass. She would take a cherry, sit up and eat the meat and throw the pit away. That fall we made a good hole for her to winter in, with a nice nest, but she got away. In the spring, however, she came back and has lived under the house ever since.

When she was two years old, she had baby 'chucks, two white and three normal. They stayed with us and fed in front of the house on the lawn, attracting many visitors. The next spring she had one white and two normal babies. Last spring I took some bread to feed her and when she came towards me, two small white 'chucks followed her from the hole. Soon the whole family came out to feed; she had four white and two normal youngsters.

A Labor of Love

The story of Thomas Howell, pioneer botanist of the Northwest, who worked twenty-one years to produce a single book on the regional flora

By NINA KOPP

THE greatest pioneer botanist of the Oregon country—the most patient, persevering and self-sacrificing—was Thomas Howell. It was he who persevered against great odds to accomplish a labor of love, the writing of *A Flora of Northwest America.*

The records of the early life of Thomas Howell are scanty indeed, and without detail. At eight he set out from Missouri with his parents in the memorable covered wagon train that started early in the spring of 1850 for the Oregon country. Almost from infancy Thomas had expressed deep interest in plants and flowers. Upon his arrival in the beautiful Oregon country he was overjoyed with the myriad of growing things.

This boy, with this great love of plants, grew to manhood and continued to live in fertile valleys of Oregon. In a letter written during his early years he is said to have described Oregon as "a park on a large scale that could not be surpassed even by artificial culture." Wherever the Nature lover wandered over mountains or valleys, scenes of beauty awaited him. The broad prairies, mighty forests, rushing streams, snow-capped mountains, presented a picture both romantic and grand. The marshy meadows of the Grande Ronde Valley were a revelation in the spring, with their broad expanse of blue camas blossoms simulating the blue of a lake. These meadows gave the young botanist an opportunity to study the great historic camas fields, and proved to him there were two species of camas, one bearing a blue flower and the other a white flower. The root of the blue camas was used as food by the Indians; it was so desirable that wars were fought by the Nez Perce Indians over the historic meadows. The other, probably not a true camas, has a deadly poisonous root. These poison bulbs were sometimes used by crafty Indians to do away with an enemy, since it was almost impossible to tell one root from the other after it had been dried.

As the years passed, Howell's love and interest in flowers intensified. With his knapsack on his back he wandered over the region that is now known as Oregon, Washington and Idaho. Trudging along on foot, camping out under the stars, he wandered from mountain to river bank, uprooting specimens, often stopping by the wayside to identify and arrange the plant while it was still fresh. Then the newly-found treasure was placed in his little home-made pressing frame. He made further studies by the light of the evening camp fire, and upon reaching home he often sat up all night recording descriptions, or putting in order his multitudinous notes from the field.

THOMAS HOWELL, OREGON BOTANIST
1842—1912

It is difficult to realize the vastness of the area over which he tramped. In addition to his home state, there was that area which now forms the states of Washington and Idaho. There were times when he had to live upon the country through which he roamed. There were few roads and many places he visited were then unexplored by white men, yet this defenseless wanderer passed along the trails without fear. Bears, coyotes and wild life of many kinds were to be found in the mountains. The country was still not without its Indian troubles. Without doubt he often sat beside the great fireplace in a pioneer cabin and, in his shy way, became a friend of the household by telling the children stories of what he had seen in his wanderings.

In 1876 Thomas Howell set about in earnest to do serious collecting. He gathered the plants into their genera and identified the species. He soon found that there was no work describing completely the flora of the Northwest. At this time he set for himself the task of collecting and classifying, in botanical sequence, the plants of the territory. By 1882 he felt that he had enough knowledge to start his book. During the early days of his authorship he received encouragement and help from his friend, Martin Gorman, who often read and revised his proofs. The works of other botanists, Asa Gray and Sereno Watson, helped him supplement his data on plant families. A pioneer in any field in this new country needed patience and perseverance to accomplish his task; these were Mr. Howell's

WALLOWA LAKE, OREGON, ONE OF THE PLACES WHERE HOWELL WORKED

Among the many new species he described some are to be found only in this area. Photograph courtesy of Harley Richardson

outstanding qualities. About this time he discovered another almost insurmountable obstacle. He could find no printer in Oregon equipped to set up technical matter. Again the virtue of perseverance proved its worth. He learned to set type, and for more than eight years he worked on the printing of his book.

When he was fifty years old, he married, and started a small grocery store in the little town of Clackamas, but soon moved to Hood Street in South Portland, Oregon. There he continued his study of plants when not engaged in earning his living as a grocer. Every hour he could spend away from the store, and every dollar he could spare, he gave to his book. He did all this work purely because of his love for plants, without aid and without hope of any great financial reward at the end. The people of Oregon might well honor Mr. Howell for his unselfish efforts to advance the scientific knowledge of our Northwest.

The first part of his book was produced in 1897, and other parts at intervals. Always too poor to hire an adequate and capable printer, he had to continue to do his own printing. His completed work describes 3150 species, 2370 of which are herbaceous flowering plants. The remainder are trees, shrubs, sedges and rushes. About ninety species were described by him as new. It is the only botanical work that covers this part of the United States, and, although out of date so far as to nomenclature, it is still basically the most important reference flora of the region.

Twenty-one years passed between the first effort at writing and the completion of the book in 1903. At that time the author was glad to receive five dollars a copy, and was eager for customers. Original volumes are very scarce today. Even the State Library of Oregon refuses to let the book go outside its doors, and collectors are fortunate to find a complete copy.

Thomas Howell died in Portland on December 3, 1912, and his grave may be found in Vancouver, Washington, just across the Columbia River from Portland, Oregon.

"Simple in manner, unaffected in speech, of few wants but of great capacity for fortitude, he asked little of the world," and it is certain the world gave him little.

•

Transplanted

By EMMA UNDERWOOD DAY

Little wild rose, were you homesick
When you opened your petals this morn,
And found yourself here in my garden,
Far from woodlands where you were born?
But ferns and wild iris are growing here too,
And I hope it will seem very homelike to you.

Perhaps it was cruel to lift you
From your native haunts, shady and cool,
And carry you, while you were sleeping
To bloom by my back-garden pool;
But the snowberry grew very gladly for me,
And the elder is making a beautiful tree.

Little wild rose, blooming sweetly
The green, quiet waters above,
What joy will be mine to accord you
The best of my service and love.
For I, too, am dreaming of forest ways wild,
And I, like yourself, was once Nature's child.

Little wild rose in my garden,
With your fragrance alluring and shy
You shall whisper a message of healing
To world-weary ones who pass by;
That somewhere are stream-banks where tall lilies nod,
And sun-dappled shadows, and quiet—and God.

Some Snake Pets

Perhaps we are queer, but, if so, we don't mind, says

ELEANOR WHERRIT

•

THAMAR AND ONE OF HER PETS
When she was three she attended a lecture on herpetology and was allowed to hold one of the snakes. Here she is with her own Rex

•

"WELL! I've been in many a home but never have I been in one such as this where they keep snakes for pets. It seems so queer!" was the parting statement made by a little old lady visitor who didn't hesitate to express her opinions emphatically.

I am sure there are many who will agree with her. I am equally certain that many people dislike, or fear, reptiles merely because they are not familiar with them, and because, in America, reptiles are not common as household pets. Will you let me introduce you to one of ours?

Rex (you may call him *Ophibolus getulus getulus* if you'd rather) was born and raised in Florida. The books call him a common king snake but he gives every evidence of having come from a very fine old southern family, for his manners are perfect, and he keeps his glossy black and greenish-white body well groomed.

Most of his time is spent on the back porch where he suns himself in his big glass case. We used to keep a pan of water in the case, for he loves to bathe, but in his enthusiasm to get into it, he sometimes tipped the pan, spilling the water. If we did not see this, he would have to lie in his wet case until it was cleaned. He once caught cold in this manner and developed a wheezy lung condition, but plenty of "babying", plus a lot of sunshine, brought him back to health. Since then, his bathing is done in a big tub of tepid water where he wriggles and squirms and actually wags his tail in appreciation and gratitude.

About three or four times a year he feels it necessary to change his wardrobe, so he removes his entire outer covering and emerges with a lustrous, highly-polished new coat, beautiful in its sheen and glowing with iridescent colors. When he was younger, he could shed his skin all in one piece. Now it comes off in sections when he scrapes himself over a rough piece of slag placed in his case for that purpose.

He is fastidious about his food, refusing to eat anything either dead or injured. And he doesn't have a voracious appetite for he eats only once every four weeks, at which time he takes two or three live white rats, which the Doctor buys for him, so the family budget can easily stretch that far without straining. He is most merciful to his prey for before the rat is aware of what is going to take place, Rex, with lightning-like speed, has wound several lithe coils around his victim, tightening them so quickly that the creature is quickly benumbed and strangled. Not until he is sure the rat is dead does he loosen his hold and proceed to his meal.

Rex is gentle, amiable and friendly. He likes the attention we give him, and when he is lifted out of his case he curls his five feet of suppleness and power into your lap to get every bit of warmth there is. Sometimes he slides his black nose up and around your arm or waist, all the time sending his long forked tongue out to catch the vibrations around him. He is curious and must know what is going on. When he is satisfied that he is safe and that we are giving him our admiration and respect, he either winds his long body around an arm or settles down comfortably elsewhere for another nap.

"But they are so slimy! How can you bear to touch them? Ugh!"

That always brings an inner smile for it is so far from the truth. There isn't a cleaner creature than the reptile, and touching him is like putting your hand on the clean, cool smooth surface of a piece of metal. The only difference is that the reptile is alive, and moves.

"But I thought they were poisonous. What if they bite you?"

Only four kinds of poisonous reptiles are to be found in the United States and these are easily recognized. Naturally, we do not invite any one of these to live with

"PHIBBIE" POSES FOR HIS PICTURE
He rather resents having his neck held for the process, much as the photographer used to hold human heads in place

us. Any reptile will strike when he senses danger, or if a quick movement that he does not understand is made in front of him. But dogs bite and cats scratch under the same circumstances. Reptiles learn, as quickly as other animals, whether or not they are in congenial surroundings and friendly hands.

We also have, for the purpose of study, our gorgeously colored corn snake, *Elaphe guttata,* and a milk snake, *Ophiholus doliatus triangulus.* "Tata", the corn snake, came from South Carolina and is a beautiful specimen with his red-bronze saddles narrowly bordered in black. He, too, is gentle and well bred but, unlike Rex, he is restless and inquisitive and must be about his own important business when taken from his case. He is much younger than Rex, however, and when he has reached maturity, sun baths and food will no doubt be of greater importance to him than having his own latchkey.

"Phibbie" came from New York State and great was our delight when we saw his three feet of gray and olive-brown spotted length stretched across the road on a recent trip there. And he doesn't steal milk from cows, as he has been accused of doing. He is most often found in country where cattle-grazing is good, but I know it to be an utter impossibility for our Phibbie, with his small head and mouth, to extract milk from any cow, not considering the fact that no reptile will drink milk unless suffering from extreme thirst and no water is to be found. When he first came to us, he was pugnacious and ready to bite at any unprotected spot whenever opportunity offered, but he has become accustomed to us and doesn't resent having us clean his case. It is really fun to watch the development of three such distinctive personalities and to note how each one responds to our friendly gestures.

In a book that I have just been reading I came upon this passage, "It is more than passing strange that our systems of education practically ignore the beautiful lessons smiled at us from Nature's beaming face. The trees, the flowers, the fruits, the shining metals, sparkling crystals, cunning insects, birds, reptiles, and animals, all bear their specific messages of love and wisdom from God to man."

It may be that you will ask, "What good lesson can come out of a serpent?"

Nature's language is the simplest and plainest of all tongues for those who know how to read it, and from it we learn that in quietness there is strength; in wisdom there is power; in repose there is beauty and harmony. A serpent can teach us many things, but in order to learn them you must give to him your respect and protection, and if, in addition, you can give him some of your affection, then you will be amazed at the things he will reveal.

Perhaps we *are* queer to like Rex, and Tata, and Phibbie, but we also like Peter, our wire-haired fox terrier; and Toppy and Mrs. Toppy, the Australian cockatiels; and Old Timer, the turtle; and Fluffytail, the squirrel; and the myriads of bluejays, cardinals, creepers, and other birds who come to take tea with us. Yes, perhaps we are queer, but, if so, we surely don't mind.

•

Forest Pool

By ELEANOR ALLEN

Jewelled pool where shadows creep
Over water fast asleep;
On the pool a patterned sky
Drifts and floats where lilies lie
Resting in the water's shade
With cups of white and leaves of jade;
Only silence lives and broods
In these forest solitudes;
Breath of wind through little ferns
Quickens as the evening turns
Purple-blue, and moon and stars
Flood the sky with crystal bars!

THE SPECIMEN THAT STARTED THE AUTHOR ON HIS INTERESTING GAME HUNT

The almost perfect figure of an antelope. The figure stands about eight inches high with neck upstretched. The twig at the right is introduced for atmosphere. All specimens are in a size in proportion to this one

Game Hunting with a Pair of Pliers

By FRANK DUNN

WHY TREK to far-off Africa for elephant, giraffe, or lion? The deserts of our Southwest are teeming with them. Nor need one imagine the thrill of stalking prehistoric dinosaurs for they, too, abound in the nation's sandy back-lot. No guns, no rations, no safari—just a pair of mechanic's pliers!

Unlike other hunting, however, a good knowledge of the structures of animals and a keen imagination are important to the plier-armed Nimrod. When I say a vivid imagination is important, I mean one must be able to visualize some particular animal formation in each root or freak growth—for these are the "big game" of the huntsman with pliers. He must have a goal before starting to strip off superfluous shoots and branches, and "create" one of Nature's creatures from unpromising material.

It all started about twelve years ago. I was rummaging around in the brush of the Death Valley region, smitten with the idea of finding a plant whose root would meet all the requirements of a pipe manufacturer. After six weeks all likely possibilities had been declared unsuitable by my colleague in his laboratory back in New York.

My idea was still just an idea but my efforts were not unrewarded. I had discovered, in one of the root entanglements, the sleek, graceful form of an antelope. With a pair of pliers from my car I snipped superfluous branches one by one, shortened leg twigs to a uniform length and there was a neck-craning antelope, complete to its forked horns.

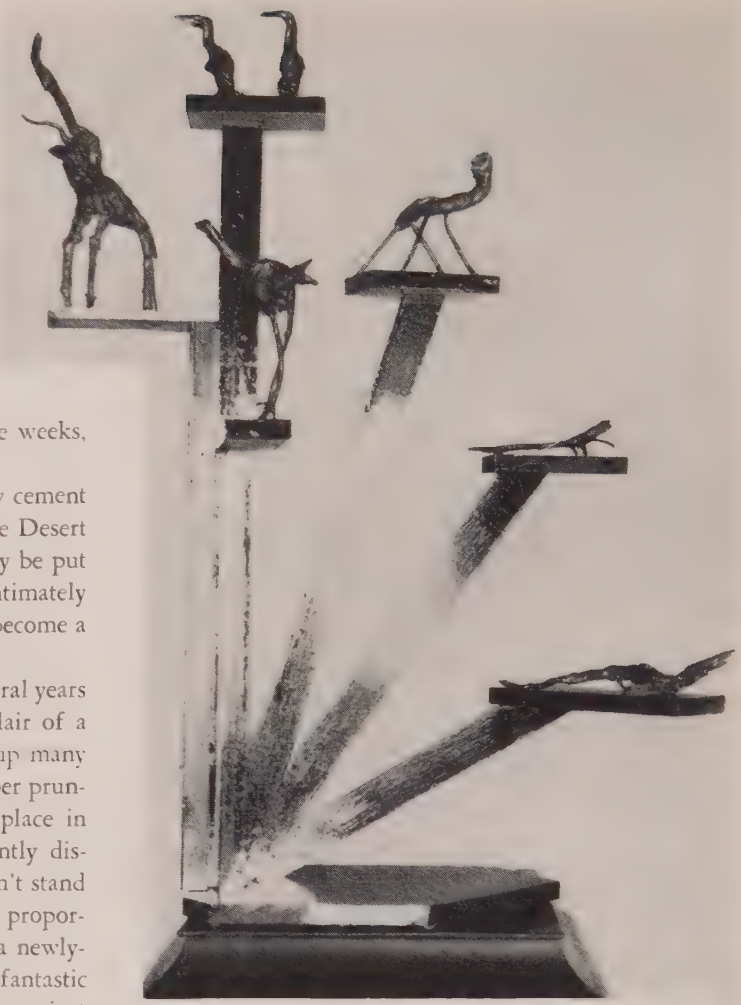
Thus came number one in my root menagerie, and with it was born the urge to hunt more fauna in the flora of the desert. This singular hobby has been the source of joy

and provides the constant thrill of discovery.

Nowhere in the world, I am sure, is there such an assemblage of weird, gawky and ungainly shapes as in our Southwestern desert region. Fleshy, thorny, leafless succulents; gaunt Joshua trees, the ghosts of the desert dawn, huddling in small groups as though discussing their spooky escapades of the night before. In the spring, after the winter rains and freshets have roused and nurtured them, the stunted annuals burst forth, each in its own particular tint of soft pink, boisterous flame, or lavender. By early July many other plants have had their brief, colorful two or three weeks, and surrender their brilliance to the torrid sun.

The average motorist streaking over the narrow cement ribbons that cross the vast expanse of our Mojave Desert looks upon it as something that cannot too rapidly be put behind. I, too, disliked it at first, but after living intimately with all that is a part of desert existence, I have become a full-fledged "desert rat".

But to return to the hunt. After hunting for several years I developed a strange ability to spot the likely lair of a sleeping beast. It was necessary, at first, to pull up many withered plants before finding one that, after proper pruning, was recognizable instantly as worthy of a place in my root zoo. Many fine specimens were reluctantly discarded because they lacked sufficient detail, or didn't stand up on their own feet, or were too large to fit in proportionately with the rest of the herd. Occasionally a newly-uprooted entanglement containing unusually fantastic twists, curves or angles seemed almost to cry out against being discarded as a "negative". Sometimes they seemed to clamor for further study, and, so, were taken along and left at the door of the cabin or trailer. Every so often I would change their position in the hopes of discovering



SOME OF THE AUTHOR'S SPECIMENS DISPLAYED

Mammals, birds and reptiles are found in this collection. Below, Mr. Dunn admires the figure of a man, the only formation he has that does not represent Nature in the wild. This figure has been called the "Ho-Hum Man" and has been both widely publicized and generally admired for its individuality

the animal lurking within. This was so in the case of one of the dinosaurs, which, incidentally, I prize as highly as any in my collection except one.

And just a word about this special root masterpiece. It is the only piece that is not in the form of a wild animal. It is a fascinating figure of a man standing on his right foot, left lifted and crooked, with both arms upstretched in the exact pose of a tired man stretching. I christened him "Ho-Hum Man", and both Robert (Believe it or Not) Ripley and John (Strange as it Seems) Hix used that name in their cartoon picturizations of him. He stands about ten inches high and lacks only distinct facial features and a right foot. It is a piece of American

AN EAGLE ON THE WING

This is a fragile, hollow shell made by insects, but otherwise has not been changed. Note the suggestion of an eye. Below, Junior Monkey clings to its mother's back. The long, thin tail is almost where it should be, and the parent's legs are balanced and in proportion. This specimen has proved to be a popular one

ginseng, *Panax quinquefolia*, an eastern herb used for the brewing of a curative tea.

With rare exception these growths are found below the ground. Roots contort themselves more eccentrically than the shrub proper. To hunt these curios, then, would ordinarily imply arduous labor with pick and shovel—but that is not so. That is why, perhaps more than any other reason, this hunting is confined to the loose, gravelly territory of the desert where the dead plant can be uprooted with a strong hand tug. However, I have made numerous searches in various parts of the country, including the states of New York, Florida, Illinois and Washington, but consistently with no success.

Not unlike other hunting expeditions, the dog is an essential member, if for nothing more than his silent, congenial companionship. I've always made these trips without human company because no matter how enthusiastic the desire on the part of a companion to tag along, I've found that before the glow of the first day had faded into the purple of the desert dusk I've had a bored and fretty individual to contend with. Kalinkowitz, my fiery Dalmatian, was never bored. Snakes, lizards, gila monsters, horntoads, cottontails and jacks occupied most of Kalink's time. He has more than once warned me of the menacing presence of aggressive sidewinders or lurking gilas, but has never sought to discourage me in the pursuit of my odd hobby.

Devoted to the vitally important subject of stream pollution, and written by Kenneth A. Reid of the Izaak Walton League of America, the January issue of the American Nature Association *Quarterly Bulletin* is now available to members of the Association on request. This important conservation issue will be actively before the current session of Congress and the enactment of effective legislation depends upon public support.

Horticulture Goes Modern

Nutrient salts and artificial light suggest intriguing garden possibilities for the curious

By C. F. GREEVES-CARPENTER

•

BRIDGE LAMP DOES DOUBLE DUTY

Experiments prove that artificial light will serve in place of sun in winter and on cloudy days. Various light fixtures have been devised for this purpose. Photograph courtesy of the General Electric Company

•

GARDENING in water or in sand, gravel or cinders containing nutrient salts is something comparatively new in the realm of horticulture. It has caught the popular fancy as is indicated by the number of companies packaging different nutrient salt formulas. That this is more than a passing fancy is obvious, and it offers such a fascinating field for continuous individual experimentation, be the worker a trained scientist or the merest amateur.

Ordinary gardening in soil is full of romance, but tank gardening, or hydroponics as the scientists term it, offers more highly-controlled conditions so that it is possible that bigger and better crops of flowers, fruits and vegetables may be produced. It is also quite within the realm of possibility that the depth of color, as well as the actual color itself, may be controlled in flowers; that their aroma may be strengthened, or made more subtle in the case of some of the present-day pungent varieties; and that more luscious fruits and vegetables having markedly superior taste may also result. In fact, the possibilities would seem to be almost limitless, and they are all within the scope of individual experiment. The amateur who gains some knowledge of the chemistry of hydroponics may just as easily tumble on the secrets as the trained worker who more diligently and painstakingly will work toward a given objective.

Let us, for a moment, see what has already been accomplished by skilled workers on a scientific basis. Dr. W. F. Gericke of the University of California, who might be termed the "father" of hydroponics, reports that 24.65 bushels of potatoes were grown in a basin whose area was 435.6 square feet, and that only 40 pounds of chemicals, or nutrient salts, were required. The average field acre produces only about 1-1/5 bushels on a like area. The same authority has obtained 1224 pounds of tomatoes from four basins covering 130 square feet of greenhouse space, and their production required only 28 pounds of chemicals, costing approximately three and one-half cents a pound. These figures, though, should not be interpreted as meaning that bigger and better crops are the invariable rule in hydroponics. They are quoted merely to support the contention that it is entirely within the realm of possibility that such large crops may be characteristic of hydroponics under given conditions.

It is claimed by some workers that it is economically possible to produce such crops as tomatoes, potatoes, melons, beets, carrots and tobacco, as well as certain floral crops, such as begonias, chrysanthemums, snapdragons, roses on a commercial basis. Dr. Gericke, however, claims that small grain cereals, wheat, barley, rice, and the fibre crops, such as cotton and flax, as well as forage crops, cannot compete economically with those grown by agriculture.

The new technique of growing plants by hydroponics is a wide application of an old principle employed in laboratories by plant physiologists in studying single specimen plants grown in beakers. It is Dr. Gericke who is credited with first adapting the principle to commercial usage, and it is now possible to use this technique in the home, the home garden and the greenhouse.

Practically any plant that may be grown in soil may also be produced by hydroponics. The advantages of attempting

MUMS GROWING LUXURIANTLY IN GRAVEL AND CINDERS WITH NUTRIENT SALTS

Splendid results obtained by the Division of Floriculture of the Ohio State University, where interesting experiments are being carried on in this field

to grow plants under this new technique are that the degree of nourishment given the plants is known; that they may be grown where there is an absence of soil; that they are free from soil-borne diseases, and that there is every opportunity to experiment in mixing formulas with a view to controlling color, size and, in the case of vegetables and fruit, flavor.

Various scientists have developed different formulas, and several firms have packaged and marketed these nutrient salts. Formulas are available in the literature of various State agricultural experiment stations—notably California, Ohio and New Jersey—and one may make up and vary them according to experience or the results to be achieved. It is simpler, however, for the amateur or average experimenter to use packaged nutrient salts rather than to bother with mixing them himself.

Here, briefly, is the practical procedure involved in the hydroponic technique. Any tank of wood, black iron or concrete coated with a pure asphalt base may serve as the container. A practical size for early experiments would be a tank which measures six feet by two feet by six inches deep. A spigot should be placed in the bottom for drainage of the solution every two weeks. For the initial solution, pour in 25 gallons of water, make a mark at the water level so that as the solution evaporates more water may be added, then add the nutrient salts. Dr. John M. Arthur of the Boyce Thompson Institute for Plant Research advises that to each successive tank of solution saturated solutions of boron, manganese and iron should be added at the rate of two drops of each of the former and ten drops of the latter. Subsequent bi-monthly changes of solution are made necessary by the plants absorbing some of the minerals. After the solution has been drained and the plug put back in the drainage hole or spigot, twelve and one-half gallons of water should be poured in the tank, the nutrient salts and the drops of saturated solution added, and then the tank should be filled up to the 25-gallon mark with water put in under slight pressure to ensure an even mixing of the salts.

COURTESY GOULD HARROLD

SUCCESS WITH TOMATOES

These and other vegetables have been grown to large size in nutrient solutions

The bed for the plants has been prepared by stretching some one-inch galvanized wire mesh—two-inch if large plants are to be set out—on a frame attached to supports that fit into the tank and allow for the wire to be three inches above the level of the solution. Paint the wire, too, with pure asphalt paint. Make a two-inch-bed of straw or excelsior. Dampen it and sow the seeds, but when first starting seeds or seedlings, increase the level of the solution by adding water until it rises to within one inch of the bed and keep the bed moist until the tap roots reach into the solution. The attendant dilution of the salts is not important, but after the first draining of the solution it should be kept at the normal mark—three inches below the bed of plants.

EASTER LILIES WITHOUT SOIL

Experimenters with hydroponics have had interesting results with a variety of flowering plants. Courtesy Gould Harrold

To set out seedlings or plants that have first been grown in earth, moisten the earth before removing the plants so that root injury is avoided. Then wash the roots under a gentle spray of water to remove all traces of soil, and set them out in a three-inch deep bed, planting them so that their roots are immersed in the solution. Soon it will be noticed, with the more mature plants transferred from soil to nutrient salts that the brown "earth" roots will drop off and the white "water" roots will be produced. Keep the bed moist at all times, but avoid allowing it to become saturated.

The question of aeration must be considered because, with a three-inch space between the bed and the level of the nutrient solution, the air is more or less static. To obviate this condition, a small pressure aerator could be purchased at a tropical fish store for as little as $1.75, and it would introduce air intermittently into the tank.

An important factor in hydroponics is the pH (hydrogen ion) value of the solution. If the latter is alkaline, dilute sulphuric or nitric acid may be added to bring the solution up to pH 5 or 6, which may readily be determined with the new test papers now on the market.

Another interesting development that is as applicable to hydroponics as it is to agriculture is the use of artificial light to supplement the limited hours of winter sunlight, and to offset lack of sunlight on cloudy days.

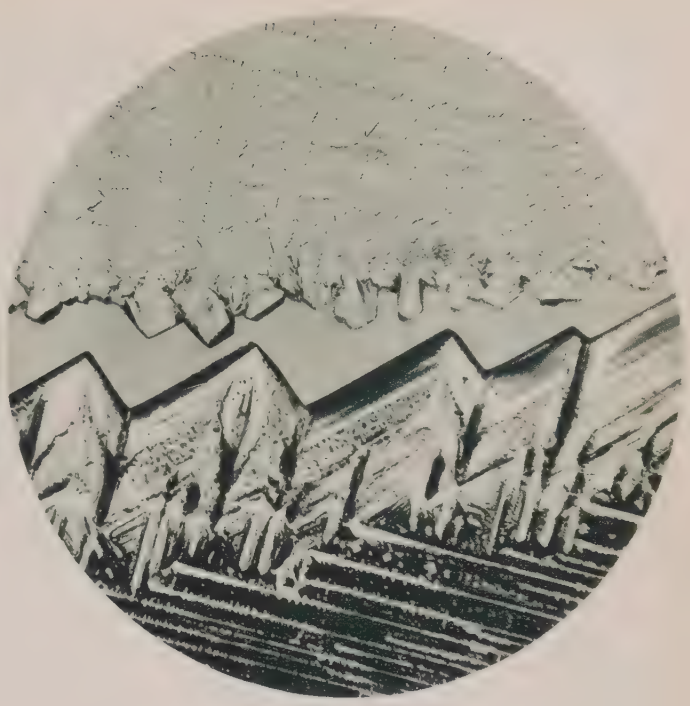
Working in collaboration with Lawrence C. Porter and his associates of the General Electric Company's Nela Park laboratories, Dr. John M. Arthur and others have proved that artificial light is definitely stimulating to plants, whether grown in greenhouses or as house plants. In greenhouses, no matter in what media plants are grown, the practice is to suspend Mazda lamps and circular reflectors on cords counterweighted by sash weights and suspended on pulleys so that they may be lowered or raised to accommodate the growth of the plants. The lamps are thermostatically operated so that when a minimum temperature is reached they are switched on and are automatically disconnected when a desired maximum is effected. It was found that the average amount of this supplemental lighting during short winter days or cloudy weather approximated three or four hours a day. It was also proved that they not only gave light necessary to hasten plant growth, but supplied a sufficiency of heat in the experimental greenhouse without any other source; 90 per cent of their energy being given off in heat and only 10 per cent in light.

The experimental greenhouse, designed by Dr. Arthur, revolutionizes the construction of greenhouses, in which there has been no radical departure in the past century. Dr. Arthur's greenhouse is an insulated house built on somewhat the same principles as a refrigerator. The walls, floor and roof are filled with a six-inch layer of sawdust between double walls of galvanized steel. The single door is insulated with sheet cork and is purposely made small to guard against excessive heat losses. Instead of being an all-glass house or one of standard construction—masonry base with glass walls and roof—Dr. Arthur determined that to obtain as much sunlight as possible, it was necessary to focus the eight separate, two-light, ordinary window sashes, which are hinged at the top, on the growing-bench at an angle of 52½° to the horizontal or water level. In certain latitudes

(Continued on page 169)

IN A GLASSLESS GREENHOUSE

Mazda bulbs are the only sun available in this basement experiment at Ohio State University



What appears to be a jeweled pendant above is really a pinch of boric acid powder dissolved in warm water and allowed to evaporate. It is a tiny pendant, here shown magnified about 125 times. Next are what seem to be the badly-treated teeth of an old saw, in reality crystals of alum magnified about 125 times. The larger ones are formed by slow evaporation of the solution, the smaller ones by quick evaporation. Below, what looks like cut gems against the night sky is really a 150-times magnification of the crystals formed from tincture of iodine. For photographing, they were illuminated by a top, side light.

JEWELS IN THE MEDICINE CLOSET

By CORNELIUS DENSLOW

Supervisor of Nature Projects, Brooklyn Children's Museum

(*Photographs by the author*)

Possibly you have at some time envied the person who had fabulous wealth and could possess all of the jewels that the heart might desire. And again, possibly, you have not realized that you undoubtedly have in your own possession at this very minute many thousands of jewels that rival in beauty any that could be purchased with all of the money in the world. They may be small, to be sure, but even a low-power microscope will soon correct that. And the thrill of discovering new forms and shapes at every turn will more than compensate for their not being wearable. More than that, you can even watch their very birth into visibility, which is in itself a fascinating experience.

To enjoy your collection of jewels, you need a microscope, a few small bottles and several of the common remedies found in the medicine closet.

For your first experiment, put a spoonful or two of water in one of the bottles and add as much boric acid as the water will dissolve and then add a pinch more for good measure. Warm water aids in dissolving the boric acid. As soon as the solution has set-

tled and become clear, take a drop and spread it out thin on a clean microscope slide. Place this on the stage of the microscope and watch! Generally the action starts near the edge of the drop. Beautiful jewels, tiny but perfect, begin to appear. Under your very eyes they grow larger and larger. Others appear. Out of nowhere they seem to come. In a moment or two the water has completely evaporated from the section within your view, and the growth of the tiny gems has stopped. If you wish you may turn to a new section of the slide and watch the action all over again, but no matter how many times you turn to a new section you will never see exactly the same scene twice.

Each different substance forms crystals of a shape peculiar to itself. Also, the speed with which the water evaporates affects the appearance of the final result. Quick evaporation tends to form small crystals and slower evaporation causes the crystals to become larger.

By using top illumination, instead of the usual method of lighting from underneath the specimen, some of your crystals will shine out with new and entrancing beauty.

You may wish to experiment with the use of other solvents to dissolve the substances that are untouched by water. Alcohol, carbon tetrachloride, xylol, ether, etc., may be tried with interesting results.

Probably not everything you try will be entirely successful, because some substances do not form crystal shapes, but a failure now and then makes the successful results more interesting.

There are common substances that are known to work well—salt, alum, bicarbonate of soda, borax, boric acid, tincture of iodine. As soon as you get to experimenting you can easily add many others to your list of "poor man's jewels", the beautiful gems that we all possess, but in most cases fail to enjoy.

Bicarbonate of soda takes on new and different charms when its crystals are formed and viewed through the microscope. Above, the "carnation blossoms" are such crystals illuminated by a top, side light. They are magnified about 100 times. Another view of the same crystals photographed by having the light come through them instead of being reflected from them. Here the magnification of the coral-like crystals is about 150 times.

ODDMENTS

When Philip Berquist of Arlington, Washington, came upon this "figure" lying in the woods he was startled, understandably. Having his camera with him, he brought back a record of Nature in a sculptural mood.

Driving along the Eastern State Parkway in Putnam County New York, Elizabeth Huntington of Pleasantville, New York, spied a tree with a needle's eye in it. Two, or possibly three, trees have grown together to make this interesting formation.

When this egg was cracked in the kitchen of Harold W. Clark of Pacific Union College, Angwin, California, a normal inner egg was found, the shell of which was of the usual thickness. When the outer shell was broken, some thin albumen ran out. The patches sticking to the inner shell are of a thick, limy material. The specimen has been preserved in the College natural history museum.

Giant Cactus of Lower California

Photographs by Laurence M. Huey

Growing to surprising size in surroundings that seem most inhospitable to plant growth, this giant cactus, ***Pachycereus pringlei,*** is one of the most spectacular and interesting of the cactuses. One may get an idea of the girth of one of these desert giants from the size of the gun, with thirty-inch barrels, held by the man standing at the base of the cactus shown below. What might be the weight of this great plant would, at best, be a guess, but with its water content included it would probably be several tons.

On the next page we see a strange and uncommon growth on the cactus. Such a growth is called "monstrous" by the botanists and is, of course, a deformity and one of obscure origin.

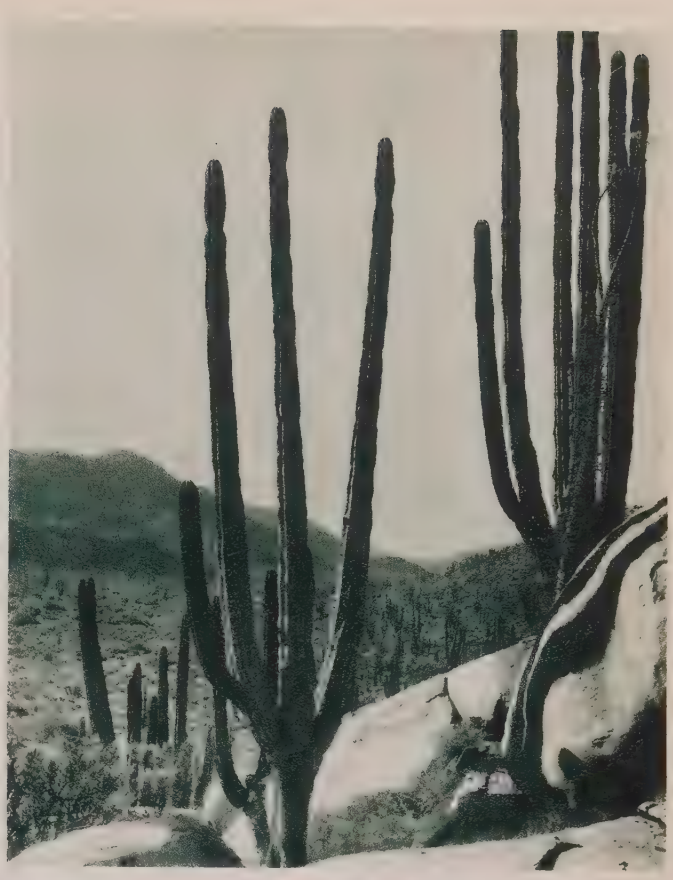
At the top of the next page we also see the desert giants growing on the slopes of hills of decomposed granite. When rain does fall it is ready to take advantage of it, rapidly sending forth feeder roots to absorb as much water as possible. When the porous soil has been drained by these roots they die back to the main supporting or anchor roots. The water thus gathered is stored up inside the tough "skin" of the cactus. This outer covering, accordion-like, expands and contracts in proportion to the pressure within, and the growth of the cactus depends upon the amount of water available.

Normally the flowers of the giant cactus are out on the ends of the branches and the photographer needs a ladder to photograph them. Now and then, however, fruit and flower may be found near a scar or break in the plant's tough "hide."

Wreath-like, the flowers are usually waxy white. They have a delicate fragrance and attract many insects, which, in turn, attract the desert birds. When the fruit ripens it is bright red and a favorite food of the woodpeckers. The fruit is sweet and was extensively used by the Indians for food.

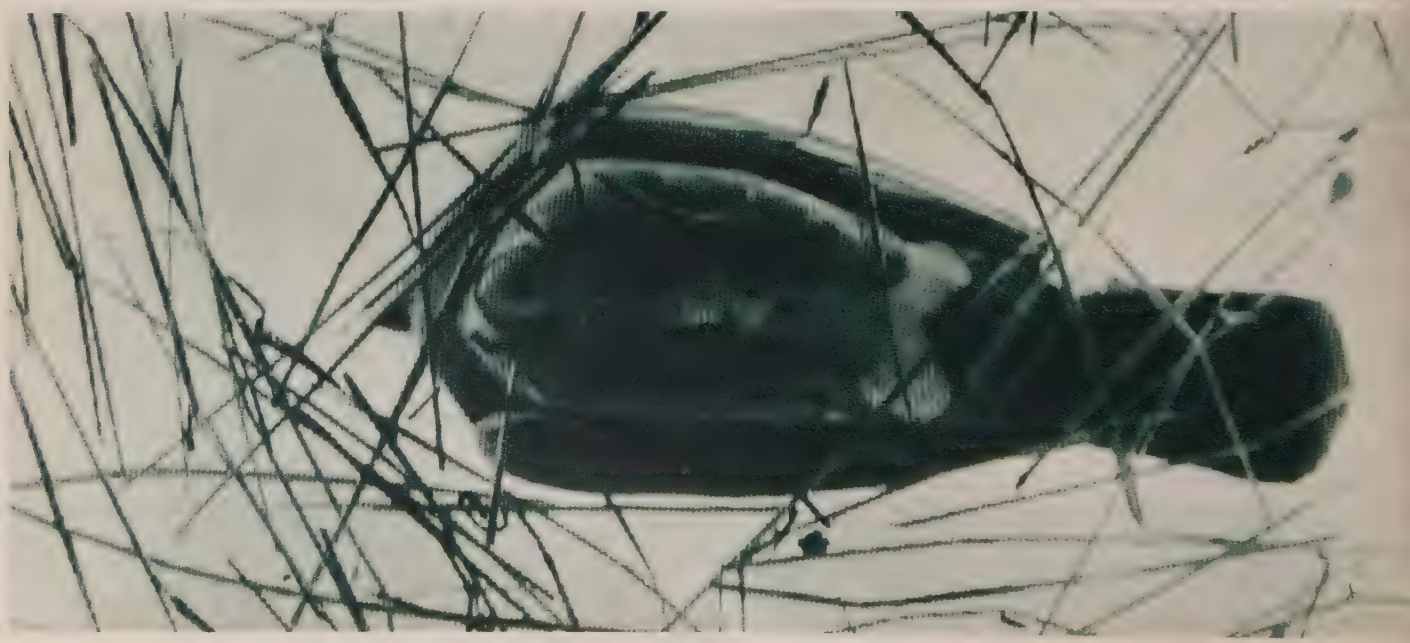
Like all the giant cactuses, ***Pachycereus pringlei*** affords nesting sites to those birds that must depend on large tree-like species. Especially do the larger woodpeckers rely on them, and at least one form, a race of the Gila woodpecker—***Centurus uropygialis cardoni,*** is named for ***pringlei,*** and is said to have a range that is exactly coterminous with that of the great cactus.

In the deserted holes of the larger woodpeckers (including the gilded flicker), the pygmy owls and other small species, besides certain other cavity-nesting birds, not only raise their young, but find resting places in the winter nights. Thus do the giants befriend the small creatures.



The shadow of Mount Hood, Oregon, stretching for many miles on the fleecy softness of a sea of clouds that hide the Willamette River Valley below. This spectacle, seen at sunrise, is well worth the effort required to view it. Photograph by Ray Atkeson.

Nesting on screening over a skylight, a brooding pigeon was photographed from below. The straw is what passes for a nest, having been scattered by the vibration of the bird's landing. The two eggs can be seen between the bird's feet. To get the proper perspective, hold this picture above your head. Photograph by W. Bryant Tyrrell.



THE TARANTULA MOLTS

Photographically recorded by Lee Passmore

Spiders, like insects, from time to time shed the outer layer of the cuticle of the body. This process is termed molting and the cast skin is called the exuviae. The number of molts and the intervals between them varies with different species, and have been determined in only a few cases. The cuticle of the cephalothorax and of its appendages, the legs, pedipalps and mouthparts, is firm and inelastic, being hardened by a horny substance called chitin. It will not stretch with the growth of the spider, and, periodically, the cuticle becomes too small and must be shed. Before this is done, a new cuticle is formed beneath the old one; then the old skin bursts open, and the spider, casting it off, appears in a soft new skin that stretches sufficiently to accommodate the increased size of the growing body.

Before the molting actually begins, the tarantula turns over on its back, as shown in our first photograph, and when seen in

that position appears as if dead. After a short time the legs are raised and lowered slowly. This action is repeated a number of times before the actual separation of the shell-like covering of the cephalothorax and the sternum, from which the legs and other appendages are withdrawn.

The old cuticle is loosened by a fluid excreted from the glands of the new skin. The female shown in this series of photographs was eight years old at the time these pictures were made. She had been taken when young from the burrow in which she was hatched, and placed in a cage, where she is still living.

The second photograph reveals all of the legs and other appendages free of their old coverings. The mouth-parts, including the fangs, appear light in color in this photograph. The horny covering of the sharp fangs will not be replaced for several days, and during this time the tarantula is quite defenceless.

The tarantula has reversed her position in the third picture, and is now shown standing beside the exoskeleton in which she lived for twelve months. All of her legs and other appendages were withdrawn from the openings that appear in the center of the photograph. It will be noticed that the inverted carapace is still attached to the soft skin covering of the abdomen.

All of the exoskeletons shown in our last photograph were molted by one spider. The two smaller sheddings were cast during the first year; the other six were molted at twelve-month intervals. With the leg coverings extended and the carapace in position the exoskeleton might easily be mistaken for a live tarantula, so little damaged is it in the process of shedding by the spider.

★ Conservation ★

A part of Nature Magazine each month is devoted to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

★

AN ORPHAN FOR ADOPTION ★

"In the entire natural resource family, water is undoubtedly the orphan step-child . . . of all natural resources, no other has been so wantonly neglected and abused in its exploitation for private profit or political expediency. Of all the various abuses and misuses of water, the selfish and inconsiderate use of the nation's waterways as convenient depositories for all undesirable wastes from both industries and municipalities is the worst and the most widespread. Pollution of streams and lakes has been a gradual and insidious process from an unappreciable beginning to a present crisis of first magnitude that is not merely a menace to public health, but which strikes at the very foundations of our entire economic and social structure."

These are clear and indisputable words by Kenneth A. Reid of the Izaak Walton League of America in the current issue of the American Nature Association *Quarterly Bulletin.* This issue of the *Bulletin,* now available to members of the Association on request, is devoted to the problem of water pollution. In the battle for effective legislative means to check the pollution evil, the Izaak Walton League has long been a militant leader, and Mr. Reid a stalwart and informed general. His discussion of the past and present of the pollution situation, and his and the League's proposals for its solution, constitute an important document. The American Nature Association is happy to lend its support.

The extent, the menace, and the costs of pollution are well known. Its causes and its effects are as well understood as are the steps necessary to its correction. Yet pollution goes on as industrial interests and communities succeed, year after year, in blocking remedial action. Hoping for a time to postpone the inevitable, they take refuge in pleas for "further investigation"; for stalling rather than for remedial legislation. No further inquiry is necessary before we start control. The facts are ample and appalling. One needs to go no farther than the Nation's Capital and the horribly polluted Potomac River to discover pollution

NO MORE TEETH THAN A PUPPY DOG

facts, and to see conditions that are nationally prevalent.

Industrial wastes and municipal sewages, poured into streams, are the major sources of pollution. Opposition to effective laws and tactics of delay come, then, from these sources. Industries wish no action that will require them to install disposal plants. It is much simpler to pollute, regardless of the consequences. Communities find it more expedient politically to spend money on parks and other such developments than on sewage plants, irrespective of what it may mean to the river itself and to the communities farther down stream.

In other words, the opposition to really effective control of pollution arises from selfishness and lack of vision. There being little prospect of a change of heart among those short-sightedly fighting against pure streams, the only answer lies in mandatory Federal law that says what it means and means what it says.

Such a law is represented by the bill sponsored in the Senate by Senator Bennett Champ Clark of Missouri. This is an effective pure-streams bill that every conservationist can and should support. Further, it is a measure that should enlist the support of every citizen interested in the economic stability of the United States, and the health of its people.

Under the Clark Bill the Army Engineer Corps is designated as the administering and enforcing agency. Past experience has demonstrated that the National Resources Committee does not want to administer the bill and that the U. S. Public Health Service is interested only in investigation and does not welcome the task of enforcing a pollution law with teeth in it. The Army Engineer Corps does not seek the responsibility but is equipped to do the job and will accept it if Congress asks.

Provision is importantly made in the Clark Bill, however, for creation of a committee to advise and cooperate, this committee to consist of the Surgeon-General of the United States, the Chief of the United States Biological Survey, the Commissioner of Fisheries and the Committee on Water Pollution of the National Resources Committee. The Federal authority would cooperate with any State agencies established to deal with water pollution to the end that the work of the states might be made more effective. Surveys would be made and Sanitary Water Districts established for which standards of water purity would be determined with local district boards. These boards would seek to obtain voluntary abatement of pollution where possible; to consider loans for the construction of sewage disposal plants; to institute proceedings for the prevention and abatement of water pollution in such districts.

Under the provisions of this bill the rights of the States are properly safeguarded. The participation of informed and concerned agencies is amply provided for, and a logical program is established. The terms of the bill will, without doubt, be misrepresented by the opposition, as in the past. We believe, however, that such distortions will meet with less success at the present session of Congress. The force of public sentiment for *real* control of pollution has grown rapidly. It must be recognized by Congress, and we are certain that it will. It is of tremendous importance that a pure-streams bill, equipped with a full set of teeth, be enacted into law.

•

SANTEE-COOPER CONTRACTS LET

Contracts have been let and digging has started on the Santee-Cooper power project in South Carolina, a waste of the people's money and the nation's resources that beggars description. Fifty million dollars will be poured down a rat hole to produce power that nobody wants or needs. South Carolina politicians say that they have never yet passed up a silver dollar and do not intend to pass up fifty million of them, and the jobs and patronage that go with them. So now millions from the public pocketbook are about to be spent, not merely for political "pork", which is bad enough, but for senseless destruction of irreplaceable natural resources.

Of no concern to South Carolina politicos, of course, is the fact that this project means the destruction of the last great wildlife area on our Eastern coast. Supporting a wide variety of woodland life, and an even greater variety and quantity of fresh and salt water life, this region is our last unpolluted haven. Diversion of the waters of the Santee into the Cooper will upset the important biological adjustment of the region and eventually destroy these natural resources. To provide temporary jobs for workmen on the project, the future living of many people depending upon these resources will be wiped out.

Protests on two occasions held up this steal. Conservationists fought it. Wildlife specialists warned of the crime involved. Power authorities proved that there was no demand for the kilowatts promised. Politics was too strong for all of these. History will record its folly.

•

"I thought it was a big hawk," claimed Bailey Faulconer, fire chief of Fayette County, Kentucky. He was being prosecuted by the State Fish and Game Commission for shooting an eagle, which—as well as all but three species of hawks—is protected by law. Also Mr. Faulconer is alleged to have shot the bird from the public highway, although this is punishable by law. He was acquitted. The case, however, served to bring out some interesting points, particularly the assertion of the State Fish and Game Commission that shooting from Kentucky highways with high-power rifles "at anything that moves" is prevalent in that State. The State Commission faces a tremendous job of education in Kentucky.

• • •

Since the creation of the National Forest Reservation Commission in 1911, and with it the delegation of authority to approve lands for National Forest purchase, 15,672,572 acres have been fully paid for. This land lies in 31 states and Puerto Rico.

In view of developments in recent National Park administration tending toward exploitation, we neither supported nor opposed the creation of Olympic National Park. So strongly do we feel, however, that vision for the future demands a new attitude on the part of those in control in the Park Service, that we are disposed to oppose creation of any more National Parks until there is a return to those principles originally drafted and endorsed by the hundred public organizations in 1929. This would apply to the Kings Canyon proposal, in connection with which the attitude of the United States Forest Service toward such wilderness area is equally at stake.

A SCENE IN THE SOUTH FORK OF THE KINGS RIVER CANYON

A Four-foot Path to Everything

By ARTHUR NEWTON PACK

IN 1929 the Campfire Club of America drew up a definition of a National Park and a declaration of National Park policy. This was endorsed by some hundred organizations interested in the function, use and preservation of these areas. The following quotations, taken from this report, are overwhelmingly significant today:

"The existence of the parks is justified and insured by the educational and spiritual benefits to be derived from contact with pristine wilderness."

"National Parks are spacious land areas essentially in their primeval condition and so outstandingly superior in quality and beauty to average examples of their several types as to demand their preservation intact and in their entirety for the enjoyment, education, and inspiration of all the people for all times."

"Parks must be kept free from all industrial use, and . . . sanctuary, scientific and primitive values must always take precedence over recreational or other values."

"Cultivation of crowds for the sake of records or profits, and the introduction of the pleasures of ordinary roadside and mountain resorts [must] be regarded as violations of National Park standards."

Are these principles a part of the policy that our National Park Service is now following? Is this the policy that we believe that the Service should follow? Let us look at the facts.

Records *have* been sought. Park vies with park. Figures of increased travel into the parks, largely by automobile, are proudly published. And the National Park Service has come face to face with an over-production of visitors. It has filled its roads, parking areas and other facilities with motorists and has felt that it must build more roads in more places, and exploit larger areas to care for yet more. The only alternative would be to limit the number of park visitors, and that, regardless of the original ideals, would be undemocratic, or unfair, or, more practically, conducive to enmity on Capitol Hill.

So, in the past six years, with millions instead of thousands available for construction; with many people to put to work building roads and buildings to spend PWA and WPA millions; with camps of CCC boys to be turned loose on the landscape, the engineers, architects and landscape specialists of the Park Service have had a field day. Planning and civilization have been the keynote. The policy has become that of building a four-foot path to everything—nicely graded paths, carefully engineered to make it easy for great-grandmother and little two-year-old Willie. The joy of discovery, the thrill of surprise is increasingly being denied the visitor.

Secretary of the Interior Ickes personally appears to recognize this. In an address outlining plans for administration of Olympic National Park, which, he declared, must be kept a wilderness, he makes general observations to which we heartily subscribe. He pointed out that "when a National Park is established, the insistent demand is to build roads everywhere, to build broad easy trails, to build air fields, to make it possible for everybody to go everywhere—*without effort.*"

"These last two words," he continued, "are what cause the trouble. It is characteristic of the American people that they want everything to be attainable *without effort.* Too many of us want a predigested breakfast food for our

stomachs and a previewed National Park for our eyes. Nine people out of ten, visiting our National Parks stay within half a mile of the motor roads and the hotels. Some of these people appreciate and love the parks, but are physically handicapped. For these we should show the greatest possible consideration. Others feel that they are roughing it if they twist their necks in a sightseeing bus, or expose their adenoids to the crisp air while gazing through field glasses at some distant scene. And these are the vast majority.

ZUMWALT MEADOW IN THE SOUTH FORK OF KINGS RIVER CANYON

"You know what happens when too many elk or deer are herded in a small space. They overbrowse it and destroy the foliage. Well, wherever we open a motor road in a National Park, that part of the park tends to become overbrowsed by human beings. This is something we have to accept, and allow for, because the parks are for everybody, but we do not have to expose the entire park to overbrowsing by its human visitors.

"I am in favor of opening a liberal and representative section of every National Park to those who, because of physical limitations, are confined to motor roads. I am even willing to make this same concession to those who cling to motor roads as a matter of choice. But let us preserve a still larger representative area in its primitive conditions, for all time, by excluding roads. *Limit the Roads.* Make the trails safe but not too easy, and you will preserve the beauty of the parks for untold generations. Yield to the thoughtless demand for easy travel, and in time the few wilderness areas that are left to us will be nothing but the back yards of filling stations."

As to generalities no one can quarrel with this statement, picturesque as usual, of the case. But Mr. Ickes is the head of a large and far-flung department. He cannot personally check every projected road in a National Park. He cannot know in detail how the spirit of his views is carried out. And, too, he is in a strategic position to blunt the edge of criticism by such fine general statements as that quoted above. Such a statement, in fact, does not jibe with the most recently-built and disfiguring road in Crater Lake National Park. It does not fit with the constant threat of a highway on the west side of Glacier National Park into the Kintla country. Mr. Ickes has voiced a hatred of skyline roads, but PWA funds are building the highway along the backbone of the Appalachians.

Currently words are being passed back and forth between the United States Forest Service and the National Parks Service in relation to the proposal to carve a chunk out of Sequoia National Forest and make the Kings River Canyon area a National Park to be known as John Muir National Park. This is, without doubt, an outstanding scenic area. It is, apparently, worthy of National Park status. Yet, under its present administration, it does not appear to be in danger of exploitation. Logging would not be feasible and no road development is projected. If its present administrative status is maintained, it should, of course, be kept primitive.

Legislation is now pending, however, to create the National Park. The Forest Service has indicated a firm intention of fighting it. Local interests are, in some instances, opposed, fearing the locking up of water needed by the farmers in the San Joaquin Valley. Also, local sportsmen are against added areas closed to hunting, and the plea is made that California already has enough Park area.

In connection with the Kings Canyon proposal, Mr. Ickes has issued a statement declaring that if this Park is authorized he would "treat it as a primitive wilderness, limiting roads to the absolute minimum, maintaining foot and horse trails, excluding elaborate hotels, admitting all responsible packers, promoting good fishing, endeavoring to restore such nearly vanished wild life as the Sierra bighorn, the southern wolverine and the Pacific fisher." He also declares that administration of such an area points "to the need for a greater stability of policy than can be insured by administrative order." To remedy this he suggests that Congress "define and set standards for wilderness national parks, as well as provide for wilderness areas to be proclaimed and similarly protected by law in other national parks."

One would gather from this that the Secretary does not feel that the administration he has outlined for Olympic National Park can, or will, be carried out without action by Congress. Passing the buck to Congress is not the answer. If the National Park Service will adopt real standards and stick to them, that should be enough. Men in the Service know better than does Congress the areas with which they are dealing, and if they will renew their allegiance to the original ideals that should be sufficient.

Things to Think About

Free, full and frank discussion of conservation problems confronting the American people will be provided at the sessions of the Seventeenth Annual Convention of the Izaak Walton League of America to be held at the Congress Hotel, Chicago, from March 16 to 18. Anyone interested in the outdoors and in conservation is cordially invited to attend the general sessions of the convention.

• • •

A one-man campaign for roadside improvement is being conducted by John Peterson of Baltimore, Maryland. He has had printed on the message side of a penny postal card, under the heading "Tree-Lined Roads," the following: "All appropriations for road building and improvement should automatically carry provisions for roadside tree planting. Had this been done when good roads were inaugurated in this country, we would now have a most beautiful countryside, comfort in travel and great enhancement of property values. The cost of such a program, considering the amounts spent on our road systems, would be so insignificant and the ultimate results so desirable that it is hard to believe we have not taken full advantage of this wonderful opportunity. Your support and encouragement of this idea would be most helpful." Mr. Peterson sends the cards out to people he thinks might be interested and might help the idea along. More power to Mr. Peterson. A rural countryside lined with beautiful shade trees would offer no inducement to the present usurpation of the rural landscape by billboards.

• • •

There are some 1500 community forests in the United States growing some 143 million man-planted trees, according to compilation made by the United States Forest Service. These forests serve varied purposes—production of timber crops, watershed protection, recreation. As a by-product they attract wildlife, and, frequently, they are adjuncts to Nature study and conservation work in the public schools. The community forest, long important as a source of revenue in Europe, could well be even more extensively developed in the United States. Thousands of acres of land reverted to towns, cities and counties for non-payment of taxes could be put to work growing trees. The majority of such acres are suited to no other purpose.

• • •

So far as we know the first museum to have a section devoted to conservation is the Buffalo Museum of Science through its Spaulding Hall of Conservation. (If there are others we will undoubtedly hear of them after printing the preceding sentence.) This exhibit is made possible by a gift of Mr. and Mrs. Harry B. Spaulding, and it is the result of two and one-half years of work by Paul and George Marchand, artists. One exhibit shows a woodland scene with wild flowers and wild animals. Then comes a picnic party, leaving in its wake wilted flowers, broken branches, refuse and a burning fire. Finally a breeze has fanned the fire into flame that leaves desolation in its wake. Other groups are equally graphic. When in Buffalo do not miss this fine contribution to conservation education.

• • •

Of interest to those working in the field of roadside improvement and control are two recent publications of the American Planning and Civic Association, Union Trust Building, Washington, D. C. One of these is entitled *Roadside Improvement* and is a 24-page pamphlet discussing the situation generally, proposing a roadside development and control act and an act to regulate outdoor advertising, and a compilation of existing State laws. A 32-page pamphlet contains a summary of the discussions of the recent joint conference on roadside improvement held in New York. In the same field the National Roadside Council, 119 East 19th Street, New York City, has brought out a compilation of important court decisions of the United States Supreme Court and State Supreme Courts bearing upon billboard regulation. This is a valuable document for legislative chairmen and workers. Finally, the American Automobile Association, Pennsylvania Avenue and 17th Street, Washington, D. C., has proposed a Uniform Act for Roadside Development and Control, presenting it in pamphlet form. Further discussion of this material will appear in an early issue of Nature Magazine.

• • •

From the editorial page of the December, 1938, issue of *The Wilson Bulletin,* we quote the following:

> In running through a file of papers on conservation we ran across a printed leaflet giving the "Extension of remarks of Hon. Fiorello H. LaGuardia, of New York, in the House of Representatives" on April 29, 1926. At this time he was discussing H. E. 7479, known as the migratory bird bill. This bill contained the provision for public shooting grounds, and Mr. LaGuardia was opposing it for that reason. On this subject Mr. LaGuardia said: "When the bill was before the House in the Sixty-eighth Congress I voted against it. I did so for the reason that I am strongly and unequivocally in favor of a real bill for the protection of the bird life of this country and that I am unalterably opposed to an unsportsmanlike bill, which, under the guise of a conservation of bird life bill, creates so-called sanctuaries that may be turned into shooting grounds for unsportsmen hunters to slaughter birds." Mr. LaGuardia further exposed the lobby that was behind the bill. He gave his full support to the Merritt Bill (H. R. 10433) which provided for reduced bag limits on game birds. His record in Congress shows him to be a true conservationist, and a fearless one.

We note that the present editor of the Wilson Bulletin, T. C. Stephens, is retiring. We trust that his successor will seek to emulate Mr. Stephens' zeal in encouraging conservation ideals. Our wildlife sorely needs militant championship from its friends in all places where the printed word is found, and no less, we may add, in the Halls of Congress.

Nature in The School Room

IN THE article on school museums in the November issue of NATURE MAGAZINE it was suggested that in many homes there are Nature collections that are gathering dust and serving no real purpose, while the local school would find these of great help in Nature study and science work. A splendid example of the inspiration that may come from such a gift to a school is pictured above.

To St. John's School in Delphos, Ohio, an interesting and varied coral and shell collection came from a friend in California. It included eight varieties of corals, a beautiful chambered nautilus, and a number of univalve and bivalve shells, starfishes, sea horses, and sea urchins. The result was that the students in the seventh and eighth grades were soon deep in conchology and submarine exploration, going down, in spirit at least, with Dr. Beebe in his bathysphere.

Two of the boys felt that a submarine setting should be supplied for the exhibit. They collected pictures of deep sea life and from them created the sea life blackboard mural, later coloring it. Colored plates were gathered for a frieze above the board, and members of the class took part in programs devoted to undersea life. Later the exhibit was set up in the Delphos Public Library.

Collections of this sort, whether of birds, flowers, mammals, or insects, would similarly challenge the ingenuity of the youngsters in most schools. We are indebted to Sister Mary Azeveda, Sister of Notre Dame, for opportunity to reemphasize this most important suggestion.

•

In Dim Retreat

By U. C. DEIKE

I heard a pewee of the wood
  Before the golden dawn
Had etched the weeping willow trees
  Upon my velvet lawn.

Wo-o-e-is-me-e-e! Wo-o-e-is-me-e-e!
  The sad bird seemed to say
From deep within a cloistered dell
  Where hermit thrushes pray.

His melody came plaintively
  And hauntingly inside,
As if to tell that in the night
  A faithful love had died.

In vain I tried to pierce the veil
  That slowly swept along
To see the gentle, trembling throat
  Throb out its grief in song.

Poor Little Friend! I understand
  And sympathize with you,
For tragic fate has stricken me—
  And I am grieving, too.

Fog-bound, I fear to move until
  The solace of the sun
Has cleared the mists of yesterday
  And tears no longer run.

And though I cannot sing like you,
  So mournfully, yet sweet,
I feel the spirit of your theme
  And share your dim retreat.

A Wall-less School

Rocky Mountain National Park Junior Nature classes result in national network Nature broadcast

CHILDREN on their vacation went to school last summer in Rocky Mountain National Park, Colorado, and liked it. They enjoyed towering mountain peaks, flower-covered meadows, inquisitive deer and rippling brooks instead of classrooms, desks and blackboards. Their books were the unwritten pages of the outdoors.

For ten weeks, classes were held two and three times weekly under the direction of Raymond Gregg, Park Naturalist, who in late June established the first Rocky Mountain Junior Nature School for children from 10 to 16 years. Courses of study included flowers, trees, park geography, glaciers, birds, mammals, insects, Indians and first aid. Each session covered two hours. To be awarded a general Nature study certificate, the student was required to show a satisfactory knowledge of five trees, five flowers, five birds, five mammals, five peaks, three kinds of rock, three shrubs, three first aid methods, three insects and two Indian tribes. So popular did the school become that 151 students enrolled, representing twenty states.

Park Naturalist Gregg used every effort to keep the sessions free of classroom atmosphere, and urged students to learn as much as they could through their own efforts along the trailside, and to ask questions frequently during field classes.

While originally planned for children of park visitors and from families residing in summer homes and in Estes Park Village, the Junior Nature School developed a wide following. The interest of the National Broadcasting Company through Station KOA in Denver, Colorado, was aroused in the possibilities of a new educational program.

Unrehearsed, the first program came on the air July 7 over 35 stations from Los Angeles to Portland, Maine, offering a general discussion on mountain birds, followed weekly by wildflowers, beavers, glaciers, coniferous and hardwood trees, seeds and fruits, grasshoppers and moths, other insects, and with Indian stories for variety.

During the series, listeners were told that a complete set of copies covering the ten broadcasts was available for the asking. The highlights of each program were reviewed in condensed form. Hundreds of requests were received from widely scattered sections, with New York, Illinois, California, and Colorado leading the list. Many of the copies were used in classrooms during winter and spring to bring Nature closer to students, especially those who live in large eastern cities.

Letters and cards were received from aged listeners stating they had never learned so much about Nature-lore in such short time. Bed-ridden hospital patients wrote that they could almost feel the cool breezes of the high Rockies during the programs. An inmate of a Pennsylvania penitentiary expressed appreciation for Mr. Gregg's efforts in bringing beauties of the outdoors behind penitentiary walls. He indicated that he is going to take a deeper interest in Nature when his prison sentence is over.

The wide appeal of the programs, reaching people from every walk of life, the educational value of the school classes as well as the broadcasts, are the basis of present plans to resume school sessions as early as practicable this summer. Plans are also under way to resume the broadcasts, enabling untold thousands of listeners to benefit from the Rocky Mountain National Park Junior Nature School. There is ample proof that the broadcasts arouse as much enthusiasm outside of the park as among the deeply interested students actually attending the classes.

•

DANDELIONS

By JEAN POST

Pretty little dandelions,
  Laughing at the sun,
Tell me, won't you, pretty ones,
  Why is all your fun?

Why stand you there the whole day long
  Smiling up at me,
Oh, you merry hearts of gold
  Laughing gleefully!

Lame Laws

A plea to real sportsmen to clean out the rabble

By ESTELLA R. BAIN

GOOD SPORTSMEN OFTEN CARRY STRANGE LOADS OF PASSENGERS

THERE are many people who for years have resented the liberality of the game laws of the States and of the United States. Each year they become more furious and enraged by the fearful atrocities and stupid mistakes permitted and committed under these laws. Killing of domestic stock, destruction of pets, crippling of wild animals, and killing of the hunters themselves are among the more common by-products.

Walt Williams of Almota, Washington, fed and enjoyed a covey of quail almost from the time they were hatched. They hovered about his door much as tame chickens, and were beautiful and joyous. The season opened and some ill-mannered galoots from town walked right into Walt's yard and shot the tame little things on his porch.

Earl Sumpter of Lewiston, Idaho, was camped by the Lochsa River. One evening he was attracted by a cry like that of a child. Looking up he saw a big timber wolf after a fawn. The wolf had dragged the little one from the water where it had taken refuge, but had to let go to get his breath. The fawn swam into deeper water. The doe, frantic, risked her own life in an attempt to beat off the wolf. When Mr. Sumpter yelled, the bewildered and tired fawn swam straight across the river and ran right into his arms. The wolf disappeared into the woods. The mother deer, totally unnerved, bounded away and did not come back.

Mr. Sumpter kept and raised the fawn. He was running a milk route at the time and the youngster followed the milk truck each trip; it was known and loved by everyone. But he was not allowed to keep and protect it. In the fall some men came for it. It must be returned to the forest as game for the hunters. It is easy to imagine its fate, tame and unafraid. How could it battle out its existence against man and other wild animals?

Curt Davenport of the Forest Service, living above Dayton, Washington, rescued a young deer from a rock-crevice into which it had fallen. He taught it to nurse one of the pack mares that had a colt. Toward fall it was almost full grown, and a tame, affectionate pet. However, the game laws would not allow him to retain it. Snow came, the foresters moved out for the winter. One day a car drove up. The pet deer jumped forward with joy, thinking his friend had returned. Five city men plugged him, and returned home with a brave story and a little dab of deer meat apiece with which to tantalize their friends and aggravate their wives.

But why leave the wives entirely out of this? Many of them now climb into their breeches and go along. Certainly they have a right to go, but a legal right is often an ethical wrong. It is even ethically right to wonder how a woman—the softly-feminine, alluring, tender-hearted representative of the world's standards of peace and pity—can pour lead into a deer, the gentlest, the softest-eyed creature on the earth. (Except, supposedly, that same woman.) How can she walk up and stab the fallen beauty with its mild eyes full of suffering and fear? How can she so forget her own part in the suffering of the world as to call this pleasure?

Then, after a few days of "thrilling adventures", she and her companions return to their homes, don their chiffon hose and backless gowns, and, with their rose-lacquered nails gleaming daintily over the service, preside at a dinner given in honor of the mutilated body of a once beautiful deer. She calls it sport, and even prates of sportsmanship!

The little boy who stood on the bank of a small stream and screamed back into the face of a cougar that crouched opposite him, tail lashing, held within his small body real

sportsmanship! True, he did not down his adversary, but his countering scream and the steady eye he pinned upon the cat held the big thing for just the second it required to spoil its spring and shatter its nerve. *That* was sportsmanship!

If the great hunters and huntresses gave their quarry just half that chance then they might prate of sportsmanship. Armed to the teeth they go bravely into the "wilds" and shoot down game that the foresters, shepherds, cattlemen, and ranchers have fed through a hard season.

And right here it seems appropriate to mention the rudeness and apparent ill-breeding of some of these sportsmen. A professor of art at a Washington college, recounted with humorous glee and self-indulgence his experience in shooting some tame ducks, of a wild species, that a woman had hatched and raised. He shot a number of them as they swam in the pond above the house. When accosted by the lady he "laughingly and generously offered to divide with her."

At another time and place a farmer came home to find one of his milk cows blinded by a stray and careless shot. His wife had been annoyed for days by cars roaring in and parking in the barnyard and the driveway. Quite without regard for the personal rights or feelings of the farmer's family these cars swept in and stopped in a confusion of dust and screaming brakes. Then men, boys, dogs, and often, women, would pour out of them and begin their hunt about the premises, regardless of gates, gardens, or glares. And these are only a few of the rude and aggravating things that occur and must be borne with by rural people.

Suppose the Government were to declare each year an open season on scandals. Suppose the rural people all came flocking into the cities in search of a few nice, young, beautifully-feathered scandals. It would make no difference how carefully the town folk had nourished and protected them, nor how much they had regarded them as their own personal property. Strange people would flock through the city homes, garages, lawns, gardens, grounds; peeking here and there; peering into dark closets; looking under beds; searching through the rubbish in the basement, and leaving lunch papers and trash scattered over the floors, on the furniture, across the lawns, and along the streets. How long do you think the city residents would endure a thing like that?

In early times hunting often meant food or hunger, life or death. Then it was necessary work and skill was to be admired. Today, when foods are obtained differently and the hazards of hunting are so unbalanced and unfair, destruction of wildlife seems so futile to many of us. Of course, it must be acknowledged that human beings are the only animals that kill for mere waste and pleasure.

If you were going to sell a few chickens from your flock how would you like to see a half-dozen wild, shouting, red-bedecked bush-whackers rush madly to and fro among them, waving their arms and shooting everything within sight; your dog, horse, cow, and perhaps children, until finally each one, red in the face and tired out but happy, came panting out to exclaim that he had "all of his allowance." Consider the condition of your flock; the live stock and the dead; your own nerves. You would say that was outrageous; it cut down your profits, injured and crippled others of your flock, and trampled up your good green earth, besides endangering life on your premises.

Suppose they came for your cattle the same way, shooting the ones you hoped to keep; shooting them before your wife and children; shooting them where they stood, perhaps eating potato peelings the little girl had just fed them. Then after they had shot the animals that you and your family had known as individuals they began at once dissecting and mutilating, dragging them here and there in a frenzy to be the first one "back to town with a cow". Sport?

If you were to buy meat at the shops so haggled, so badly-handled, so improperly dressed, and so entirely unprotected as is the "dragged-about" portion of the wild meat that finally gets "divided" among all the obligations, your howl to headquarters would be long and loud. And it often really happens much in this manner during the killing seasons.

To many country people the hunting season is a time to dread; they fear to enter the woods even to conduct their accustomed duties. Wise farmers keep their children indoors; the dogs tied up; the cats in the cellar, and the live-stock in the corral for the day or days open to invasion by farm intruders.

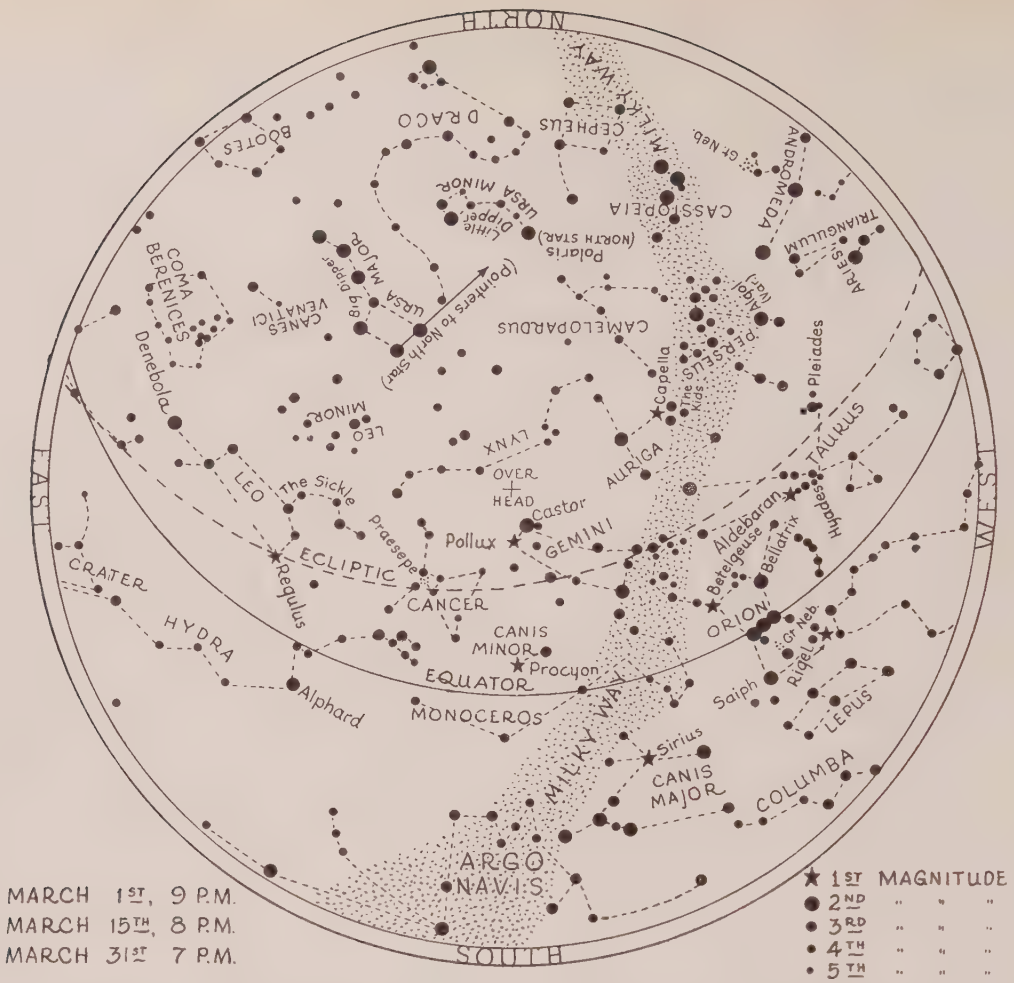
And we, as a nation, can we do no better than this? We encourage societies and organizations that interfere with the fights between black widow spiders and scorpions, but we let suffering, ignorance and violation of all the canons of good sportsmanship, and good citizenship, pass as APPROVED!

•

CONSERVATION

By OSCAR OSTLUND

The pomp of progress
In the woods, its exploitation, leaves me cold;
I sing when I behold
A rusty railroad; and paradise
Unveils its gorgeous plumes,
If, in between the auburn rustiness
Of rails—above the lichen borders on old ties—
The primrose blooms.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The How and Why of Spring

By ISABEL M. LEWIS

THAT GREAT circle of the celestial sphere which is known as the ecliptic, or apparent yearly path of the sun through the heavens, crosses the great circle known as the celestial equator, which lies directly over the earth's equator, at two points. One of these is known as the vernal equinox, the other as the autumnal equinox. Spring begins in the northern hemisphere when the sun is at the vernal equinox, coming north; autumn when it is at the autumnal equinox, going south.

At the beginning of spring the sun is exactly overhead, or in the zenith, as the astronomer would say, at just one point on the equator. To find exactly where that is one must consult an almanac, or ephemeris, which gives the sun's declination, or distance north or south of the equator, and its right ascension, or distance along the equator measured from the vernal equinox to the foot of the great circle along which its declination is measured. These positions are given for every day of the year, and when both are zero the sun is at the vernal equinox and spring is beginning in the northern hemisphere, autumn in the southern.

The longitude, reckoned from the Greenwich meridian, of the point where the sun is directly overhead as spring begins is equal to the Greenwich apparent time or "sun time" of that event as distinguished from "mean sun time" or clock time. This year spring begins at 12:29 P.M. on March 21, Greenwich Civil Time. As this is counted from midnight the "mean sun" is then 29 minutes west of the Greenwich meridian and the "true sun" is 22 minutes of time, or 5½ degrees, west of the Greenwich meridian. As the sun must also be on the equator at this time we have the position where the sun is overhead as spring begins, which is Latitude 0°, Longitude 5½° West. To find the Eastern Standard Time when spring begins we must subtract five hours from the Greenwich Time, so, in Eastern Standard Time, spring begins this year at 7:29 A.M. on March 21. For a place five hours *east* of Greenwich the civil time of the beginning of spring would be 5:29 P.M., and one may readily see that it is also possible for spring

to begin on March 21 in one part of the world and on March 22 in another part of the world, depending, of course, on the time that is kept.

As spring begins, and also when autumn begins, day and night are equal in length in all latitudes and so the sun is then said to be at the equinoxes. Strictly speaking, however, day and night are not equal in length at this time because of the effect of refraction, which causes the sun to appear elevated above the horizon before it has actually risen, and, also, after it has actually set. As a result the day is always lengthened at the expense of the night. The difference may be considerable in high latitudes. At the North Pole the equator coincides with the horizon. At the beginning of spring the sun should appear for the first time in six months skirting along the horizon. As a matter of fact it will appear several days before this date due to the effect of refraction. On this date, also, the sun should disappear for six months at the South Pole, but thanks to refraction it will delay its departure for several days.

The celestial equator, which lies directly over the earth's equator, crosses the meridian at an altitude above the southern horizon that equals ninety minus the latitude. At the North Pole, where the latitude is ninety degrees, the altitude of the equator above the horizon is, then, zero degrees, which means it coincides with the horizon. At the equator, where the latitude is zero, the altitude of the celestial equator is ninety degrees above the horizon, that is, it passes overhead, and, since the sun's yearly journeys are limited to 23½ degrees north and south of the equator, it can never, at the equator, get more than 23½ degrees from the zenith when on the meridian. At the Arctic Circle, where the latitude is 66½ degrees, the equator crosses the meridian at an altitude of 23½ degrees above the southern horizon so there is one day (when the sun is 23½ degrees south of the equator) when, if it were not for refraction, it would appear on the southern horizon for only an instant, at noon. Farther north, between the Arctic Circle and the North Pole, there will be more days when the sun will not appear at all above the horizon. In 80 degrees north latitude, for example, the equator crosses the meridian at an altitude above the southern horizon of 10 degrees. On the days, then, when the sun is more than ten degrees south of the equator it will not be seen in that latitude. In an almanac, which gives the sun's declination, or distance north or south of the equator, for each day of the year, we can find how high the sun is above the southern horizon in any latitude at noon on any day of the year, or when, in any latitude within the Arctic Circle, it will not be seen at all. What is true in the northern hemisphere is of course true in the same season in the southern hemisphere.

Within the Arctic Circle in summer the midnight sun will be visible on those days when the distance of the sun north of the equator is greater than ninety degrees less the latitude. For example, in latitude 80 degrees North, one will see the sun on the meridian due north at midnight on all days when the sun's declination is greater than 10 degrees North. At the Arctic Circle itself there will be, theoretically, only one such day and that will be the day when the sun's declination is 23½ degrees North. As a matter of fact, though, there will be several such days, due again to refraction and also to the fact that at this time the sun has practically the same declination for several days. For some degrees south of the Arctic Circle, although the sun does not appear above the northern horizon at midnight, it is so close to it that twilight lasts all night.

Within the Arctic Circle there are times, of course, when the moon and the planets do not appear at all above the southern horizon. At the North Pole the planets and the moon cannot be seen when they are south of the equator. The full moon, however, is always above the horizon in the long polar night when it is most needed, for it is diametrically opposite the sun and follows the same course through the heavens at night that the sun followed six months before in the long polar day.

Jupiter and Saturn, when they are in the far southern constellations of Scorpio, Sagittarius, and Capricornus, may not be seen for many months at a time at the North Pole. The nearer one lives to the equator the more favorable the circumstances for observing all of the planets. This is particularly true of Mercury, which never gets far from the sun.

Mars, which will make one of its closest approaches to the earth this July, will not be then visible north of the 64th parallel of latitude, while in latitude 26 degrees south of the equator it will pass nearly through the zenith. During the greater part of the year it will not be seen within the Arctic Circle, and will not be favorably placed for observation even in mid-latitudes of the northern hemisphere because of its far southern position. This month Mars will pass from Ophiuchus into Sagittarius. It will be ninety degrees west of the sun on March 21 and due south at sunrise. Early in the month it is as bright as a star of first magnitude and will increase rapidly in brightness during the month. Venus is also in the morning sky this month. Although less brilliant than usual, as it is receding from the earth, it surpasses, as always, all stars and all other planets in brightness.

This month Mercury will be seen to better advantage in the evening sky than at any other time this year. It will be at greatest elongation east of the sun on March 16 and will then set more than one and one half hours after the sun, and will be about 18 degrees above the western horizon at sunset. It should be easily visible in the evening twilight about a week before and after its elongation.

Saturn is in the southwest the first of the month, setting about two hours after the sun but by the end of March will be too near the sun to be seen. Jupiter, in conjunction with the sun on March 6, when it passes to the morning sky, is too close to the sun to be observed this month.

Spring, in this article, is the spring of astronomy. But it is well to remember that there is another spring—that of the outdoors, and of the poets—an earlier-coming one, which gives to spring its name. Indeed, the returning sun, which, in the northern hemisphere, ushers in the winter of the astronomers, already heralds the approach of the real spring, the season of the "springing" of vegetation, and of creatures that must depend on plants for sustenance.

A Paradise Bird Stamp

By EDITH M. LAING

POPULAR with collectors, a postage stamp of Papua displays a bird of paradise oddly framed in a boar's tusk.

In the steaming jungles of New Guinea are some fifty varieties of this famous group, once ruthlessly hunted for the millinery market. In return for hatchets, knives, mirrors, and gaudy colored calico, the natives eagerly supplied the traffic. Today, because of stringent protective laws, few smugglers succeed in evading the vigilant coastal patrols.

In early times only the body skins of the birds, minus wings and legs, reached the outside world, and people fancied that the glorious creatures lived entirely in the air, floating on their gorgeous plumes and sustained by "the dews of heaven and the nectar of flowers". Even Linnaeus perpetuated this fable, for he named one species *Paradisaea apoda*—footless.

In common with most birds, it is the male bird of paradise that is the beauty. A few of the many varieties, all of which flaunt plumage of brilliant hues and color combinations, are the king; the emerald; and the golden birds of paradise. Particularly showy is the red bird of paradise, with glittering green head, golden back, chestnut wings, and sweeping tail plumes of carmine further embellished with two long black filaments.

Most in demand by fashion was the lesser bird of paradise. In this species the male's youthful drab plumage gradually is replaced by glorious golden feathers on the head; deep shining green on the throat; a rich chestnut brown on breast, tail, part of the upper, and all of undersides of wings. At the shoulders the wings become splashed with golden yellow. From under each wing sprouts a cluster of splendid golden plumes that sweep back almost a foot in length, tapering off to white.

Early Malay tales relate that the birds fly every year to islands where the nutmeg is plentiful. Thus Tom Moore has the poet of Cashmere sing to Lalla Rookh of

> "Those golden birds that, in the spice time, drop
> About the gardens, drunk with that sweet food
> Whose scent hath lured them o'er the summer flood."

It is rather to come down to earth to learn that these paradisical creatures live not on ambrosial nectars, but on earthy grubs, insects, and jungle fruits; that their voices, far from trilling heavenly strains, utter harsh croakings and cawings—for they are cousins to the scolding crow.

Papua is the southeastern portion of the island of New Guinea, and is under the administration of the Australian government. Its capital is Port Moresby. Stamps of the Mandated Territory of New Guinea, formerly German New Guinea, which is another portion of the same island, also picture birds of paradise.

•

A Useful Spirea

By VICTOR H. RIES

FOR THOSE who are tired of the ever-present Van Houtte spirea, covering windows and hiding porches, smothering smaller shrubs and attracting flies, a less common spirea will be most welcome. This is the garland spirea, *Spiraea arguta,* a low-growing bush with narrow, graceful light green leaves, slender drooping twigs and a profusion of white flowers in early May. Similar, slightly smaller, blooming about three or four days earlier, a little less hardy, is the Thunberg spirea, *Spiraea thunbergii.*

Both are useful shrubs, blooming early, leafing early and holding their leaves until late in the fall, long after most other shrubs have become bare. These shrubs may be used as a background for a bird bath or sun-dial, along a low porch, in front of low windows. Their graceful habit of growth enables them to be used around the lily pool, or in back of a small rock garden. Their fine light green foliage makes them usable to produce foliage and color contrast in the shrub border. Easily grown, easily planted, they will grow in any place where there is at least a half day of sunshine.

Diana Thorne's

DOG COLUMN

The Dog For You

THROUGH various avenues of circumstance a dog comes into one's life. One may, as it were, be born with a dog. As an infant and child one may have no memories separable from dog-companionship. One may have a doggy heredity. Again, one may achieve dog for several reasons. One may desire to have "a dog like the Joneses", simply because the "Joneses" have it. Or one may desire a watch-dog for the children and the house. Or one may desire to enter the show-ring with one's own exhibit. Then, again, we may have a dog thrust upon us. The latter is often more in the nature of a predicament. It is to the individual getting a First Dog, however, that I write this.

Choosing and buying a dog that you wish for a companion, house-pet, watch dog, or for any other reason, is a tricky business. You can't go out to buy a dog as you would go out to pick up something at an auction, or even as you would buy a hat.

First, be sure that you desire a dog. Then satisfy yourself why you wish him and exactly for what purpose. Then, if you don't know dogs, and are not acquainted with the breeds, get an unbiased dog-owning friend to advise you and possibly to look at your selection. Don't take an army of helpers. And don't ask advice all around. There lies confusion.

Don't buy a puppy because you fall in love with his "cute" ways. He may be a St. Bernard and grow into a dog so huge that, if you live in a city apartment, he may crowd you and a nervous breakdown into a hospital before he is full grown.

The next pup you see may be equally "cute", but you may not see his parents. He may be a Peter Pannish fellow who never grows up higher than eight inches or so, and who has to bark before you know where he is, or before you step or sit upon him.

In fact, if you don't know much about the subject of "dog", you have a thorny path and many adventures ahead. There are points of importance. Select a popular breed such as the Scot or the fox-terrier, and get the best puppy you can afford. If you live in the country your problem is simplified because you are not limited to the smaller breeds. Consider your temperament, and age, and if you can be sure of the former.

It's important that you and your dog be congenial companions. Remember there are dogs who are silent and sedate such as, among terriers, the Cairn, and among large dogs, let us say, the Great Dane. And there are those, such as the wire-haired fox-terrier, with a superabundance of vitality requiring an owner to keep himself fit for hurdle jumping.

Consider how you live. Will you be alone with your dog, or are you introducing him to a family? In the latter case, are there young children?

When you are clear-headed on these points, set out on the quest. It's amazing how many people appear to buy, or to be saddled with, (Continued on page 168)

BISHOP BIRD HOUSES

No. 30 Bishop Wren House

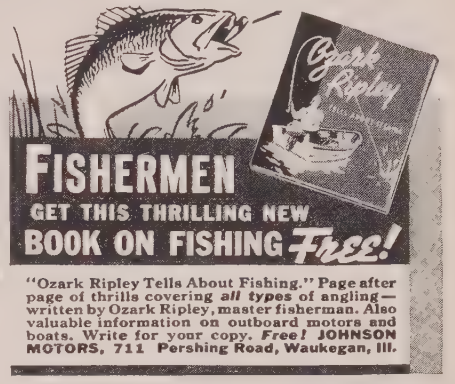
No. 4 Bishop Bluebird House

ATTRACT MORE BIRDS this spring with Bishop's famous rustic bird houses. Durably built of bark-covered hemlock and clear-grained cypress, Bishop Bird Houses are made in a variety of styles, each with the correct sized entrance and nesting compartment. Weatherproof, easily cleaned. No. 30 Wren House only $1.; No. 4 Bluebird House, price $2.50. Other models from 50 cents up. At your nearest garden equipment store or direct.

Catalog on request

WELLES L. BISHOP

25 Bishop Place Meriden, Conn.

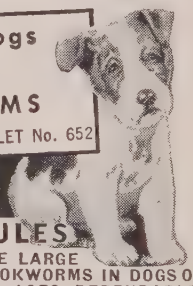


FISHERMEN GET THIS THRILLING NEW BOOK ON FISHING *Free!*

"Ozark Ripley Tells About Fishing." Page after page of thrills covering *all types* of angling—written by Ozark Ripley, master fisherman. Also valuable information on outboard motors and boats. Write for your copy. *Free!* JOHNSON MOTORS, 711 Pershing Road, Waukegan, Ill.

Keep Your Dogs *free* FROM WORMS

WRITE FOR FREE BOOKLET No. 652



NEMA WORM CAPSULES

EFFECTIVELY REMOVE LARGE ROUNDWORMS AND HOOKWORMS IN DOGS OF ALL BREEDS AND ALL AGES. DEPENDABLE.

Nema Booklet tells you about worms

Address Desk N-21-C *Animal Industry Dept.*

PARKE, DAVIS & CO., DETROIT, MICH.

Drug Stores Sell Parke-Davis Products

Free Catalog

Ready March 8

Fully illustrated, showing special footwear and clothing for fisherman and camper, also special fishing tackle.

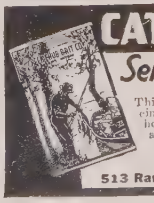
L.L.Bean, Inc.

29 Main Street Freeport Maine

YOUR DOG LISTLESS?

Worms can cause it! Use GLOVER'S Worm Medicine (capsules or liquid). Popular for over 60 years! FREE Dog Book—write GLOVER'S, 462 Fourth Avenue, New York City.

GLOVER'S DOG MEDICINES



CATCH MORE FISH

Send for FREE BAIT BOOK

This practical handbook, for fishermen, is a fascinating, reliable guide to better fishing! It tells how and why Creek Chub True-to-Nature Lures and Flies Catch More and Bigger Fish! Beautifully illustrated! Sent FREE upon request!

CREEK CHUB BAIT COMPANY

513 Randolph St. Garrett, Ind.

THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

Conservation and Nature Education in the Senior High School

Before this article appears in print the Wildlife Conference will have been held in Detroit, and from February 25 to March 2 the American Association of School Administrators will gather in Cleveland. At the first meeting a committee on education will have discussed the possibility of introducing and sponsoring a conservation program in the schools, including the senior high schools. At the meeting of educators, another committee will consider the place of Nature and conservation in the science program of the twelve school years preceding the college period. Discussion of the findings of these meetings must be deferred until later, but it is pertinent here to consider some phases of the question involved.

A survey, sponsored by the American Nature Association and now under way at Cornell University with the cooperation of Philip G. Johnson, gives us some preliminary insight into conditions as they now exist. Thus far returns from 155 cities in 32 states give some basis for comparison.

The status of conservation education in the schools might be determined by comparing its emphasis with that on other "extra" courses, such as health and safety. There are obvious reasons why emphasis on these subjects might vary in different parts of the country. But conservation is influenced most by the whims of legislators; since it is a national problem, the voting public in general should be widely informed in what is studied. We find that of the 155 cities, 13 make no pretense of teaching conservation, 23 ignore teaching safety and eight claim to do nothing in health education. Possibly these figures can not be accepted as picturing the actual situation but they are based on statements made by the school superintendents.

On the other hand, if we look for communities in which these subjects are taught in special classes we find that 54 teach health, 34 teach safety, and 20 teach conservation. If these figures can be accepted as criteria of relative merit, it is obvious that the superintendents do not rank conservation as highly as they do the other two.

The committees deliberating this month will want to know whether they should try to prepare separate texts, try to incorporate conservation work in the science courses, or include conservation ideas in all courses offered in the schools. In the returns that we have, 73 communities teach their health through the medium of science courses, 62 say that they teach their conservation in this way, and 44 that they thus treat safety. Judging by these figures, conservation work should be prominent in the science offerings. An examination of current high school science texts shows that if this is done through the medium of the textbook it will, for the most part, be academic in nature and probably not functional. It may be even more academic if this work is done in the social sciences, although it is possible that conservation may be advanced best as a responsibility of man to his fellows rather than as a responsibility of man to Nature in general. A recent interview in Florida showed little objection on the part of teachers there to a state recommendation that second grade children cut off the tails and legs of tadpoles to see them regenerate themselves. If this attitude exists among the teachers one can hardly expect that the interests of conservation can there be advanced through consideration of the feelings of dumb animals, and if this sort of practice is recommended for the second grade, one wonders where the limit in humaneness would be at the secondary school level.

The communities that contend that they teach conservation in all courses—and therefore possibly with no great emphasis anywhere—were 60 in number. This was just twice the number that introduced their health education in this way. Only a slightly smaller number—54—contended that safety was a part of all courses. It would seem from these surveys that conservation emphasis in the schools is, in general, less than the emphasis given to safety, and much less than that given to health.

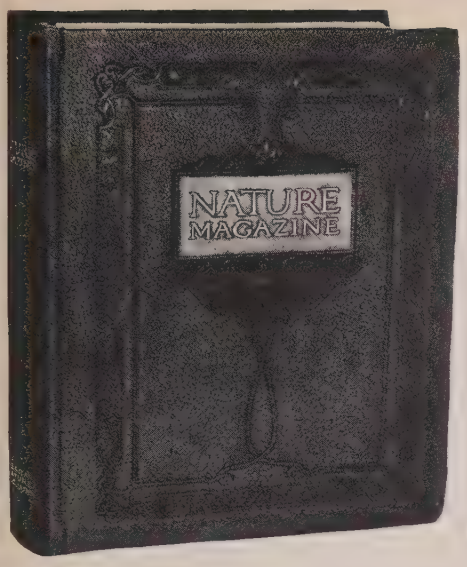
The devices used for teaching this work in these communities were interesting since they showed how few used outdoor settings for conservation education. The more natural the setting for teaching work in wildlife the smaller was the number of communities using it. Of the 155 communities, 125 used demonstration tables; 123, visual aids; 99, science clubs; 41, museums; 29, buses; 29, Nature trails; 2 (Springfield, Massachusetts and Detroit, Michigan), the trailside museum; 1, a cooperative program with the municipal park. None used municipal camps. I know that there are other communities that use these outdoor settings, but returns have not been forthcoming from those communities in this particular survey. These figures indicate that the type of conservation taught in these communities is overwhelmingly academic and of the textbook-lecture type. If this is so, and I believe that it is, it is hoped that any new stimulus given to conservation education by the committees meeting this month will be in the direction of getting away from the formal textbook instruction, and that the emphasis will be directed at bringing the children into direct contact with significant natural history problems. This will call for a new kind of training for teachers and will not permit the satisfaction of qualification requirements solely by a correspondence course, as happens to be the case in one state visited recently. It may be necessary for teacher training institutions to decide between carrying this work in the social science or in the science departments. We will discuss this in a later article on this page.

One need not be completely discouraged over the situation. In fact, there is much to give encouragement. In the last year there have been repeated inquiries from high school teachers and administrators asking for suggestions for the teaching of high school level courses in general natural history. One just received from Philadelphia outlines a course in Nature Appreciation based upon the seasonal changes in Nature that take place near the school. This is encouraging, particularly so since it is not an isolated case and such trends are not limited to any particular part of the country.

One thing has always amused the writer about high school science. It has long had back of it groups of leaders who felt that what is given the students at that grade level should be something that the student can use in after life. They have argued that it should be practical, and have then gone ahead and introduced involved work in genetics; complicated problems on the anatomy and physiology of the frog; highly technical problems in molecular physics and the nature of chemical elements, and little or nothing on an understanding of such things as color changes in the leaves in fall, practical ecology of a simple nature and on interesting things one may do with living organisms possibly in the realm of experimental psychology. Hingston's book, *Instinct and Intelligence,* the writings of Henri Fabre and others, are rarely used in guiding activities in high school biology. Yet they make suggestions that anyone can understand and that would do much to promote the wise use of leisure, which is recognized as a worthy and important function of high school education. Articles dealing with bird psychology, such as are appearing in *Bird Lore* for the first two months of this year, should have a place in high school biology to supplant much that now appears there. One can hardly read these articles without wanting to get out and try to duplicate some of the experiments there outlined.

And above all things we should have more high school texts in biology written by outdoor men. One of the most recent texts has a large page of illustrations of frogs with the caption indicating that the females do most of the singing in spring while in another part of the book we hear that it is the males who do this. This book, published in 1938, gives something on what the Federal government is doing in conservation, but nothing of what the average individual may do. It omits suggestions for simple things to be done in the biological field and substitutes what appear to be profound discussions of anatomy in which there are errors in the number of gill slits in a shark, the snake's pelvic region is incorrectly figured and the discussion of albinos and parts of the nervous system is full of contradictions. Attempts at erudition in the use of scientific names gets the authors badly mixed. The ordinary moss plant is designated as the sporophyte when it is in reality the gametophyte, and throughout the text the word microphotograph is used to indicate photomicrographs. An article longer than this one could be written on the errors in this new book, which is being recommended as a guide to the study of biology in the high school. Certainly much that appears in some of the new books is of far less value to the average citizen than what is left out. In one of these nearly 100 times the space is given to genetics than is given to wildlife conservation.

It is possible that the committees meeting this month in Cleveland and Detroit can do something to correct this situation.



Keep a Year's Issues of NATURE MAGAZINE in this HANDSOME BINDER

Every number of Nature Magazine is worth reading again and again. For your convenience and pleasure, we have secured this beautiful and substantial binder.

Grasp this opportunity for greater enjoyment from your magazines—bind them in our special two-tone, hand colored cover, embossed in gold and they will be preserved to give you a lifetime of enjoyment.

Many requests make it possible for us to offer you these artistic, leather-like covers, pictured above, especially created for our members, in which you can insert each issue, as you receive it, in a half minute, without any punching or other annoyance to try your patience.

Each binder will hold twelve issues and is guaranteed. Your money refunded if you are not more than pleased. $2.00 each

Your Name or Year Stamped in Gold for 50c extra. (both for 75c)

AMERICAN NATURE ASSOCIATION
1214 Sixteenth St., N. W., Washington, D. C.

Mail This Coupon—Print Plainly

THE AMERICAN NATURE ASSOCIATION
Washington, D. C. Date .....

Send me ..... Distinctive covers for NATURE MAGAZINE, for which I enclose $.....

If I am not unusually pleased I will return them to you within 5 days, and my money will be refunded to me.

Name .....

Street .....

City and State .....

Wildlife Casualties

Feathers and Fur on the Turnpike is the title that James R. Simmons gives to an interesting, informative and provocative little book on wildlife conservation. Over a period of ten years, Mr. Simmons, a forester, with the assistance of many friends, studied the toll of birds and mammals killed by motor cars. He examined stomachs to determine food habits and he reclaimed specimens, thus making his study do triple duty. It now serves a fourth purpose, through publication, by drawing attention to the facts and suggesting steps that might contribute to the improvement of this situation. While gathering and working up the material for this book, however, Mr. Simmons set down notes on wildlife conservation generally, and on progress and trends in its conservation. The result is that his book has two parts, the first dealing specifically with highway killing of wildlife, and the second with the general conservation picture, one of the best we have seen. There is much of practical interest to conservationists generally in this volume. It merits close attention and deserves wide reading. It is published by the Christopher Publishing House, Boston, Massachusetts, at $1.75.

An Egg Chart

Although our experience with eggs is largely confined to omelets, we were intrigued by a combination calendar and chart sent us by Holland R. Sperry from the Pope Brooks Foundation, Avon, Connecticut. Mr. Sperry writes that "the chart is self-explanatory" (which no doubt it is to the raiser of poultry) and that "the idea is to hang it up in the incubator room for quick reference as to hatching dates, or to determine the 18th day when eggs should be placed in pedigree baskets, if chicks are to be pedigreed." In any event, it looks most ingenious and useful, even to our unmathematical eye, and we note that it is equally applicable to several varieties of domestic fowl, as well as some game-farm birds. It costs a dime from the address above.

Dodo Restored

What is believed to be the most complete, accurate and up-to-date restoration of the extinct dodo is now on display at the Field Museum of Natural History in Chicago. Conceived by Rudyerd Boulton, curator of birds, and carried out under his direction by Frank Gino, this is a life size sculptured model. Dr. Boulton points out that many people think that this bird is mythical. In fact, it was a large bird related to the pigeons, but flightless, which existed in numbers on the island of Mauritius until 1681.

Bluebird House Plans

Once again The Burroughs Nature Club, 14 East 55th Street Terrace, Kansas City, Missouri, offers to send to anyone sending a stamped and self-addressed envelope illustrated plans for making a successful bluebird house.

THE AUDUBON NATURE CAMP

in beautiful Muscongus Bay, Maine

BIRDS—FLOWERS—MARINE LIFE
INSECTS—NATURE ACTIVITIES

The primary purpose of the camp is to equip each adult leader with a thorough and practical nature program, based on actual field experiences. A nominal fee of $51 includes lodging, board, tuition and all field trips.

Enroll in one or more of these periods:

June 16th thru June 29th
June 30th thru July 13th
July 14th thru July 26th
Aug. 4th thru Aug. 17th
Aug. 18th thru Aug. 31st

Write for free illustrated booklet

NATIONAL ASSOCIATION AUDUBON SOCIETIES
1006 FIFTH AVENUE NEW YORK, N. Y.

Good Teachers, Supvs., Etc. in Demand
Our field Middle West and West
Unexcelled Service
ROCKY MT. TEACHERS AGENCY
410 U.S. NAT. BANK BLDG DENVER, COLO.
Est. 1906 Member NATA
Wm. Ruffer, Ph.D., Manager
Minneapolis, Minn., Plymouth Bldg., A. Gloor, A. M., Mgr.
Largest, Most Successful Agency in the West

Succeed in Landscaping

Send for FREE Book on Landscape Training

Full details about this profitable career for men or women. Study at home in leisure time. Successful graduates find interesting profitable work. Some students earn $5, $10, $15 while learning. Pleasant work; initiative rewarded. Write today, giving age and occupation.

AMERICAN LANDSCAPE SCHOOL
6071 Grand Ave. Des Moines, Ia.

NATURE CAMP

INSPIRING . . . INSTRUCTIVE
HEALTHFUL . . . ENJOYABLE

All outdoors beckons you to a summer of self-improvement in the heart of Central Pennsylvania's picturesque mountains. A Camp unexcelled for location, food, and variety of attractions. Famous State monuments and game refuge nearby; birds, wild animals and rare plants in rich profusion. Congenial fellow students. Camp program under the competent direction of expert field naturalists. Field work for science teachers.

FIRST SESSION—June 29 July 20
SECOND SESSION—July 19 Aug. 9

WRITE NOW for illustrated booklet. Address: Professor George R. Green, Director of the Nature Camp—

THE PENNSYLVANIA STATE COLLEGE
State College Pennsylvania

DREER'S 1939 GARDEN BOOK—FREE
More interesting than ever. Quality seeds, plants, bulbs; reasonable prices.
Henry A. Dreer, 374 Dreer Bldg., Phila., Pa.

A SMALL BIRD ON A LONG VOYAGE

by Lauren McCready

The 10,000 ton oil tanker *Imlay*, loading crude oil at Port Arthur, Texas, for Point Breeze, Pennsylvania, was slowly settling deeper and deeper in the muddy waters of the Neches River as her cargo poured in through the big hoses. In the alleyway outside his office the chief engineer was chatting with the first engineer, and, about to join them, I chanced to glance down before me. There, huddled underneath a bunker filling line, was a quiet little bundle of feathers. A bird? Sure enough, but how did he arrive on this workaday oil ship, and what was wrong?

Not saying anything to the others, lest they startle the little fellow, I quietly reached down, hoping he wouldn't elude my eager fingers. Wide-eyed and helpless, he made no struggle. Next came an examination. All red. A baby, whose newly-fledged wings showed that he wasn't long from the nest. Quite stunned and shocked it was, but showing fear of being handled. Now for a cage of sorts! Luckily we had plenty of cages, for in the past one of the men had bred canaries aboard the ship. Once the little bird was in a cage, a little quiet and rest was in order.

When he had recovered spirits, we found he would eat—and right greedily too—from a medicine dropper commandeered from the testing kit we used for testing boiler water. No seeds would he eat, but oh, the soup! Yes, vegetable soup, right from the officers' mess. Stewed tomatoes, too, and moistened bread made a filling dinner for our little "Red".

We were soon to sail, and there was no choice but to take him along on the coming trip. He couldn't be turned loose as he was. Although in fine spirits, he couldn't fly because of a drooping wing. He had a pal in my room, too—"Puchunguita", a large and pretty green parrot who had made several voyages with me.

"He'll die", declared fellow crew members. I was not sure myself, yet all that voyage, as we pounded across the Gulf of Mexico, Red's cage swung and swayed from overhead in my room. Quantities of wet bread, soup, and hard-boiled egg went down his maw, and strength and cheer returned to the house guest. As we rounded Key West and started up the coast, he got more and more chipper, and became, indeed, a pet. Two birds, I had, one a wee red thing, the other a hulking green parrot who was rather cool toward the newcomer. If Red's cage was brought close, tiny red feathers would ruffle as a threat to that bold parrot. As the two cages swung in unison with the rolling ship off Cape Hatteras, nearing our home port, I could see that although the wing was better, it wouldn't do to free the little creature in the north around Philadelphia.

So, after a quick discharge of our cargo, we were off once again on the deep, Texas-bound. Now came the time for flight tests. Loosed in the room, Red would stretch and flap excitedly. Better and better. Nearing Port Arthur again, we cheered when the little wing stood a short flight. From then on it was no time before Red scorned the cage and was flitting about, from settee to wash basin to towel rack. The ship's company were delighted with this fine recovery and glad Red would soon be back in the river marshes whence he so mysteriously came to join us.

On a still night in early May, after I had come off watch in the engine room and was bound ashore for a bit of fun, I took Red with me, inside a cocoa can. Near some willows by the river's edge, off came the lid. Nothing popped out, and Red had to be coaxed out on my hand. He sat there a moment, reflecting on the new scene; then a soft whirr into the calm night and he was gone. A glimpse of him in the soft moonlight showed a strong flight into a low willow, so, as they say, "all's well that ends well".

Now, tell me, what could this little bird have been? All red, the size of a large canary, just fledged, and still looking much like a baby—that's Red. His identity I leave with the experts, as I return to the engine room of the *Imlay*.

Thank you, Mr. McCready, for a charming story of a bird friend. Red, with little doubt, was a summer tanager. *Editor.*

BIBLICAL INCENSE

by Cuthbert Gumbinger

Incense was used by the ancients in religious ceremonies, for the perfuming of homes and as an antidote to lassitude caused by great heat. Although incense can be made from about twenty-five various gums, barks, woods and seeds, yet it is interesting to note how that incense used by the Hebrews in the Tabernacle and in the Temple was compounded. God, Himself, according to Scripture, gave the recipe for this special incense and He calls it "most sweet incense" and "incense of spices" (Ex. XXXV: 8 & 28). In the actual words of the recipe "the Lord said to Moses: Take unto thee spices: stacte, and onycha, galbanum of sweet savour, and the clearest frankincense. All shall be of equal weight. . . . And when thou hast beaten all into very small powder, thou shalt set it before the tabernacle of the testimony, in the place where I will appear to thee." (Ex. XXX: 34 & 36.)

Stacte was the dried resin from a little tree, *Styrax officinalis*, of Palestine. By cutting the branches a brown, bitter resin of vanilla odor exuded. Celsius, Theophrastes and Pliny tell us this was the purest myrrh and it was expensive. No stacte is obtained from this tree in modern times, the resin being now the product of the *Liquidambar orientalis* of Cyprus and Anatolia.

The onycha was famous amongst the ancients as the "odoriferous shell". It is the operculum, or "nail", attached to the foot of *Strombus murex*, a shell found in the Red Sea and along the coast of Arabia. When powdered and burned this "nail" has a strong, sharp but agreeable odor. It should not be burned alone, but with other ingredients in order to sharpen their scents.

Galbanum is a resin and can be obtained from various trees. Modern commerce gets galbanum from a Persian herb similar to the European fennel and called *Ferula galbaniflua*. But Dioscorides, Theophrastes and other ancient authorities claim that the Hebrews obtained galbanum from the tree *Narthex syriacus*. Birdwood mentions also *Ophoidia galbanifera* of Khorasan and *Galbanum officinale* of Syria. Galbanum most probably was used to give greater body to the odor of the incense, because, when burned alone, it is strong and pungent. Therefore, too, this ingredient helped to keep away all insects from the sacred place.

Frankincense is the purest incense. In Europe it has always been obtainable, and is the best known of all incenses and aromatics from the East. Its very name means "true" or "pure" incense. It is a gum-resin from the sacred tree *Boswellia frereana* of Arabia and from the tree *Boswellia papyrifera* of Somalia. There is also the tree *Boswellia serrata* in India. The Sabaeans probably got this incense from Somalia and Ethiopia because there does not seem to have been enough of it for commercial purposes in their own country.

These four elements in equal quantity were mixed with pure salt, and burned as incense by the priests. This was done on the altar of incense, at 9 A.M., and 3 P.M., every day (Ex. XXX; 7 & 8; Luke 1, 10). Once a year a handful of it was also burned by the priest on a pan of burning coals taken from the altar of the burnt-offering (Lev. XVI: 12 & 13). It was used in certain other ceremonial rites. Later on the number of ingredients reached as many as thirteen.

Today, various religions and many countries use incense for ritual and fumigating purposes, but probably no kind of incense is as sweet and strong as that which God commanded should be burned in His honor. Just as these natural elements, sweet and bitter, gentle and sharp, when mixed and burned gave forth an excellent perfume, so, too, human life made up of bitter and sweet, of joy and pain, when suffered with courage, is pleasing to God.

THE DOG FOR YOU

(Continued from page 165)

the wrong type of dog. One sees small individuals with huge animals; huge individuals with tiny creatures that appear to be always under foot. You meet sedate or phlegmatic people with a wire-haired "devitalizer", and active people followed by lethargic, weary, overfed canines. Some combinations are grotesque.

In general, it is better to buy a puppy than an old dog. You have, of course, to face the trouble of training the puppy, but, on the other hand, the grown dog has had a master to whom he is accustomed and you are a "second fiddle" and have to wean him from his first allegiance. Some are known as "one-man dogs", so you have a hard and often impossible task. He may, and probably will, obey all your commands, but he is likely to be absent-minded and not entirely happy, and while living with you physically may be mentally waiting for another.

Again, do you like to walk? Or are you accustomed to moving every yard in a car? That's a vital consideration in your choice. Fox-terriers love cars, but they exhaust any but the strongest and youthful in the foot exercise and the mileage they require daily, as do many other dogs to keep in health.

For a watchdog, a bull-terrier, German-shepherd, bulldog, Dobermann, and others are better selections than are fox-terriers, Irish terriers and such. These last are chummy, social, get-together sort of chaps with no sense of guile.

Want to Exchange?

Mr. K. H. Lawson, 3032 West 58th Street, Seattle, Washington, would like to get in touch with other insect collectors with a view to exchanging specimens and correspondence. He is particularly interested in the South.

Have you any WILD FLOWERS in your garden?

These wildings of the woodland add an exotic charm to the shaded corner or the spot you had not known how to treat.

BUT to grow wild flowers you must know their needs of soil and care. Many of our rarer wild flowers have become so because they have not been gathered with care. Seeds of many are now available, and you may wish to save a clump of some kind threatened by the steam shovel, the road builder, or the woodsman.

IF you do you should know your wild flowers. You will find this knowledge in text and in many pictures in

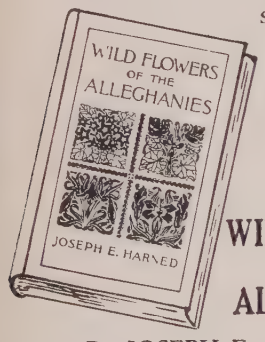
PIONEERING WITH WILD FLOWERS

an attractively written, fully-illustrated book based on a lifetime of study and experience raising wild flowers.

Send Two Dollars to

BOOK DEPARTMENT
AMERICAN NATURE ASSOCIATION
1214 16th St., Washington, D. C.

SECOND EDITION
722 Pages



A Guide to WILD FLOWERS OF THE ALLEGHANIES

By JOSEPH E. HARNED

Member Botanical Society of America, Fellow of The American Association for the Advancement of Science, Member Pennsylvania Academy of Science, American Nature Association and Wild Flower Preservation Society.

GIVES a Description of Their Character, Habits, Flowering Season, and Location; A Concise Definition of Colors, Reference to Medicinal Properties, Notations of the Insects that Assist in Their Fertilization; also Numerous Flower Legends, Historical References and a Fully Illustrated Key to the Most Important Diagnostic Characters of the Families Represented. A Check List of Ferns Occurring in the Area is Appended.

Sixteen Colored Plates

With over 400 Other Illustrations from Line Drawings of Individual Species, Leaf Forms, Floral Characters and Types of Inflorescence, made especially for the Author by Mr. F. S. Mathews, the Noted Botanical Artist.

Popular and Scientific treatment, designed especially for teachers and nature students.

Price $3.75

NATURE BOOK DISTRIBUTORS
1212 16th St., N. W., Washington, D. C.

Send me postpaid Wild Flowers of the Alleghanies. Check for $3.75 in full payment is enclosed.

Name .....

Address .....

State .....

HORTICULTURE GOES MODERN

(Continued from page 144)

and at certain seasons of the year, the angle would necessarily be different in order to avoid shadow falling on the bench and to get maximum sunlight. This minimum amount of glass, too, serves to prevent the excessive heat loss sustained in greenhouses of more standard design. Solid carbon dioxide was used as the air source, but this procedure was found to be expensive, so chickens, which give off a maximum of carbon dioxide, are kept in cages outside the house and air from them is filtered and pumped through a hose connection into the house. This type of greenhouse equipped with supplemental electric light tends to control seasonal time of flowering and the rate and character of general growth.

A different type of greenhouse, the glassless basement greenhouse, has recently been developed by Prof. Laurie at Columbus, Ohio. It is designed for finishing off plants that have been grown almost to the blooming stage, as well as for use as a propagating house. Walls are of pressed wallboard nailed on either side of two-inch by four-inch partitions, the dead air space acting as an insulating area. The inside walls are painted white to provide maximum reflection from the two sets of lights, one of which uses 200-watt Mazda lamps and the other 100-watt. The lights are placed two feet apart and 30 inches above the bench. They are operated for 12 hours each day by automatic time clock. A fresh air inlet at floor level with an exhaust fan at ceiling provides the requisite fresh air. The fan, being thermostatically controlled, makes possible the maintenance of desirable temperature ranges. As a finishing-off house, further research is being conducted as the plants require better temperature, light and humidity control, but all tests have proved the glassless greenhouse successful for propagating purposes, although only 100-watt lamps are now advised; the higher wattage causing a drying out in spite of frequent sprayings and covering the plants with cheesecloth.

The use of supplemental light in growing plants has been definitely established, and, besides its use in greenhouses, special plant light fixtures, using 60-, 100-, 150- and 250-watt Mazda lamps, have been introduced for home, office and hotel use. Thus, other conditions being favorable, perfect specimens of some of the potted plants can now be grown in the darkest corner of any room. For fernstands and window-boxes, a special type of reflector has been developed to direct the light rays over the entire oblong surface.

All these new developments in the growing of plants offer limitless scope for experimentation and research. Just as amazing results may be attained in one small tank set out in the backyard, in the basement or in a cold frame equipped with lights as in elaborate scientific equipment installed under ideal conditions.

Poisonous Plants

A quarter of a century has elapsed since the publication of the last general study of poisonous plants in the United States. In the interim research has added much to the existing knowledge. There was need of up-to-date material, between book covers, in this special botanical field and that need

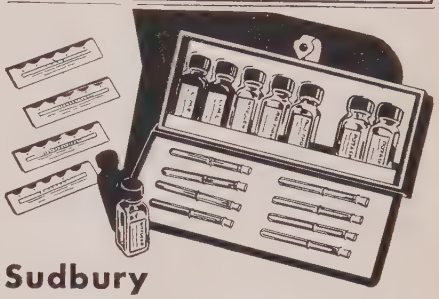
PLANT GROWING GOES MODERN

Strong, sturdy specimens grown from seeds, cuttings, or plants for Home, Garden, Field.

SOILLESS GROWTH
by
WATER CULTURE METHOD

Nutrients furnished, with full instruction folder for culture, giving also directions for seed propagation, postpaid $1.00.

CARLISLE PRODUCTS
Dep't N—P. O. Box 6061
Bridgeport, Conn.



Sudbury
SOIL TEST KIT
New Club Model, only $4.75 postpaid

This easy-to-use kit gives you, in ten minutes' time, essential soil information for a better lawn or garden. Tests for acidity and for all important plant food elements. Makes 50 individual tests. Cased in strong imitation leather. Order by mail C.O.D. (or send check or money order for $4.75 and we will pay shipping charges).

SUDBURY SOIL TESTING LABORATORY
P. O. Box 720, South Sudbury, Mass.

(Note: Home Gardener's Model, cardboard case, 20 individual tests for acidity and plant food elements, only $2 postpaid.)

GROW PLANTS WITHOUT SOIL

PLANT-CHEM is the universal hydroponic salt, the standard used in SCHOOLS and COLLEGES for all methods of SOILLESS CULTURE.

EASY TO USE. Add one teaspoonful of PLANT-CHEM to each gallon of water. Follow simple directions for the NEW EASY TECHNIQUE which requires no special equipment. So easy A CHILD CAN DO IT.

VIGOROUS GROWTH produced by PLANT-CHEM when used without soil has led many to use it WITH SUPER RESULTS on their potted plants and PRIZE outdoor plants growing in soil. They give each full size plant a pint of PLANT-CHEM solution per week.

At 1c PER GALLON or LESS, the price in the larger packages, the cost is so negligible that all can use it freely. POSTPAID, to make 15 gal. 50c—50 gal. $1.00—275 gal. $2.75

University Hydroponic Service
2229 McGee Blv'd Berkeley, California

2 Bushels of Ripe TOMATOES from ONE VINE

2 or 3 vines will produce enough tomatoes for the average family.

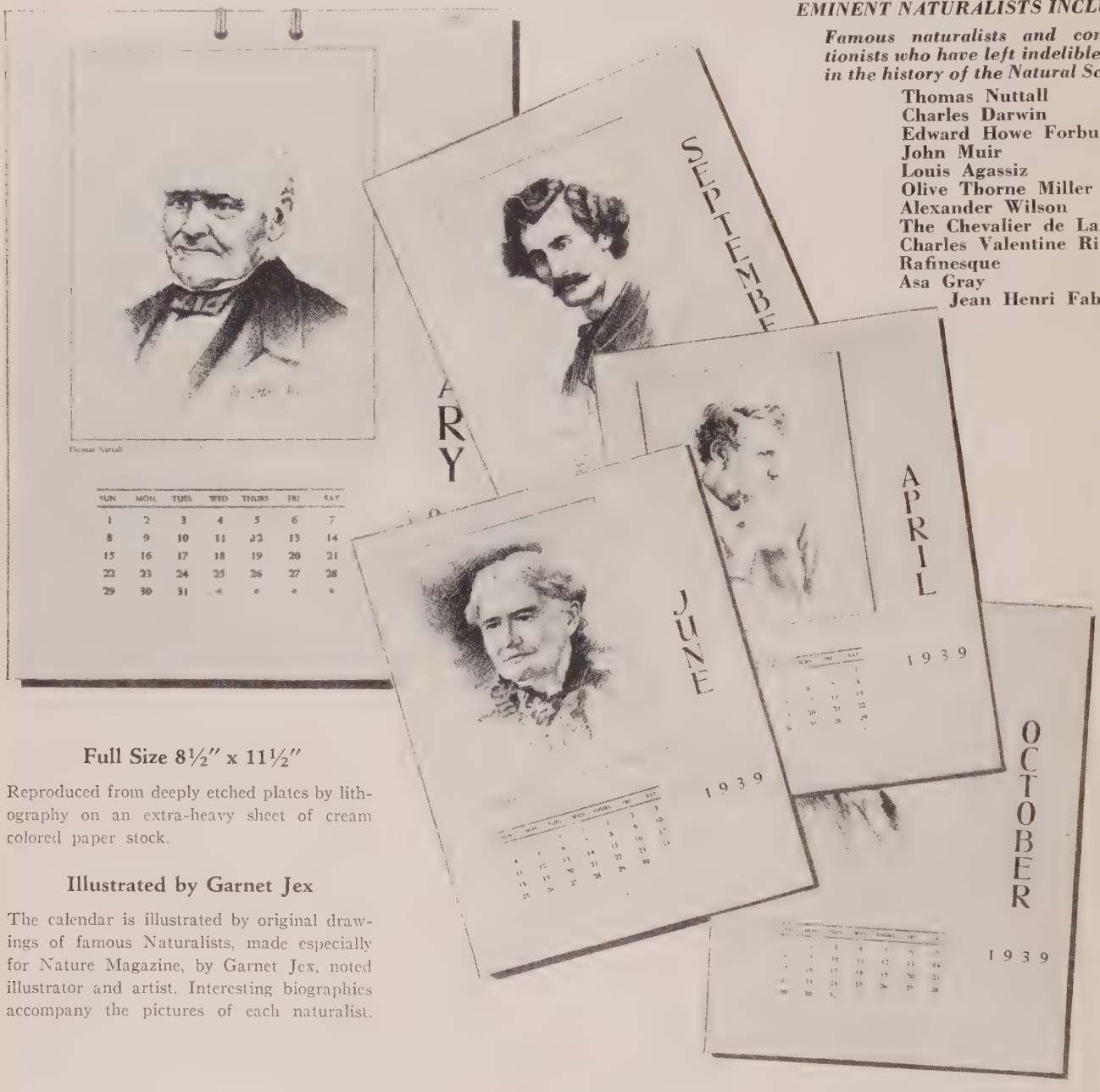
THE NEW BURGESS CLIMBING
TRIP-L-CROP
TOMATO rapidly grows to a height of 10 to 12 feet—often as high as 16 to 20 feet. Grow on trellis, on side of home, barn or anywhere. Can be grown as a bush in garden. Beautiful, large, crimson, solid, meaty fruits of best quality. The most productive of all tomatoes. Trial packet 10c-3 for 25c, postpaid.

CASH PRIZE CONTEST
Send for FREE Garden Book giving full details about CASH PRIZES to growers of this new tomato.

BURGESS SEED & PLANT CO.
340 C. T., GALESBURG, MICH.

MORE THAN JUST A CALENDAR

Nature Magazine's calendar for 1939 offers something the value of which does not end with the close of the year. Its splendid pictures and careful biographies may be preserved in home, school and library for their permanent value.



EMINENT NATURALISTS INCLUDED

Famous naturalists and conservationists who have left indelible pages in the history of the Natural Sciences

Thomas Nuttall
Charles Darwin
Edward Howe Forbush
John Muir
Louis Agassiz
Olive Thorne Miller
Alexander Wilson
The Chevalier de Lamarck
Charles Valentine Riley
Rafinesque
Asa Gray
Jean Henri Fabre

Full Size 8½" x 11½"

Reproduced from deeply etched plates by lithography on an extra-heavy sheet of cream colored paper stock.

Illustrated by Garnet Jex

The calendar is illustrated by original drawings of famous Naturalists, made especially for Nature Magazine, by Garnet Jex, noted illustrator and artist. Interesting biographies accompany the pictures of each naturalist.

INFORMATIVE. CAREFULLY EDITED. BEAUTIFULLY ILLUSTRATED. It is not too late for this calendar to be a Gift for nature loving friends and a valuable reference medium for them or you.

MAIL COUPON TODAY

One calendar $1.00
Two calendars . . . 1.75
Five calendars . . . 3.50

(all postpaid)

AMERICAN NATURE ASSOCIATION
1214 Sixteenth St., N. W., Washington, D. C.

Please send me postpaid ..... Nature Calendars for 1939. My (check, P. O. Money Order) for $..... is enclosed.

Name.....

Street & No.....

City & State .....

has been admirably met by the book, *Poisonous Plants of the United States*, by Walter Conrad Muenscher, professor of botany at the New York State College of Agriculture. In the first part of his book the author deals with the classification of these plants and with those that are poisonous or injurious under special conditions. The remainder of the book is devoted to the individual plants arranged by families and accompanied by botanical illustration. A bibliography and an excellent index round out this most valuable volume, which is published by The Macmillan Company at $3.50.

Better Gardening

Just about the biggest bargain for the gardener is the booklet entitled *Better Gardening*, written by Harry O'Brien and published by The Union Fork and Hoe Company of Columbus, Ohio. Here is a practical booklet of 120 pages to turn to for the answers to garden problems or for suggestions for planning the garden. Each year this company has brought out a book to help the gardener, and each year has added to its contents and value, benefiting from suggestions and incorporating new knowledge. The 1939 edition is a publication of which they may be proud. As to the bargain aspect, copies are available for twenty-five cents to readers of NATURE MAGAZINE mentioning the Magazine when writing to The Union Fork and Hoe Company, Columbus, Ohio.

The Lumber Trade

Of particular interest to foresters, lumbermen and economists concerned with natural resources is *The North American Assault on the Canadian Forest* by A. R. M. Lower. There is, in addition, much interesting and valuable historical material in this book, since the development and harvesting of timber resources went hand in hand with pioneering. This volume is published at $3.75 by the Yale University Press in the United States, by the Ryerson Press in Toronto and by the Oxford University Press in London.

About Trout Streams

"Cool clear-flowing streams are the domain of trout. Once such streams were to be found in all the uplands of North America. To help save such of them as remain, to help restore some of those that have been spoiled, and to report progress in knowledge of conditions that make for better fishing in all of them, are the main objectives of this book." Thus writes Paul R. Needham, associate aquatic biologist of the United States Bureau of Fisheries in charge of trout investigations, in his foreword to his book *Trout Streams*. The various trout and salmon; stream conditions; trout stream animals; food selection; food distribution; propagation; stocking; protection and management are among the general subjects discussed. This volume should be invaluable to anyone concerned with fisheries work, and of interest, as well, to trout fishermen. It is published by the Comstock Publishing Company, Ithaca, New York, at three dollars.

AN UNSUNG HEROINE

by H. H. Sheldon

One of the most unusual and dramatic incidents I was ever fortunate enough to witness during thirty years as a field naturalist occurred in the northeast corner of New Mexico, next door to that notorious bit of the U. S. known as "no man's land".

The country is a rough rim-walled series of mesas, heavily grown with junipers. Following the tracks of a deer, eyes to ground, I caught an undetermined movement some thirty feet ahead, and froze. Peering warily, I identified a cottontail. My first reaction was chagrin, and I was in the act of stepping out for more important game when something startlingly unusual about the rabbit's actions held me in my tracks. A cottontail sniffing the ground and then suddenly turning backflips was not consistent with cottontail lore.

It was at this moment that an enormous bull snake, probing the air with its head like a blind man poking ahead with a cane, moved slowly into my line of vision, coming toward me. So intent had been my focus on the rabbit I did not see the snake until a shaft of sunlight struck a spark from its shiny head.

The cottontail held a crouching stance a few inches from the snake as the six-foot reptile slid slowly forward. Suddenly the rabbit jumped to the snake's tail and sniffed. It followed up the body, sniffing, until it reached the head. Up to this point the snake slithered ahead, apparently indifferent and unconcerned with the rabbit. Abruptly the cottontail leaped at the snake's head, thumping with its hind feet, landing a blow distinctly audible from my position, now a distance of about twenty feet. Immediately the snake drew back and struck viciously at the rabbit. With little apparent effort, the nimble rabbit hopped clear of the snake's lunge, returned to sniff again at the tail end of the foe, again followed the length of the snake's body, sniffing, and again thumped its head.

The exhibition thrilled me with interest and speculation. If the snake did not change its course, it was certain to pass directly at my feet. Completely motionless, I waited. As it flowed slowly toward me, I could distinguish bulges in its body, and I began to understand the rabbit's behavior. Surely those intervaled bulges in the snake's length had once been innocent nurslings whose destruction had infused with desperate menace the timid cottontail.

As the bull snake, still harassed by the rabbit, drew its slow progress to within three feet of me, I held unwinking, trying not to breathe. Four times the rabbit had encompassed the snake. Four times it had struck and leaped back to safety from the bull snake's lunge. How long would it offer challenge? And what would it do when the snake, sluggish with its meal, should tire of striking?

Still apparently aware only of its thumping tormentor, the constrictor slid by me, within inches of my feet. It was at this instant the keen nose of the cottontail telegraphed "man-scent" through the concentration of its attack. In a flash she swapped ends and presented to me her white puff, bobbing out of sight through the junipers.

The snake had feasted upon three baby cottontails, each no larger than a turkey egg. And please note, the cottontail was frightened only when she smelled the man.

FAMOUS GARDENS OF HISTORY
KEW Royal Garden OF LONDON
Gardens old and new must receive care and protection against the ravages of insect pests. Today careful gardeners guard against many insects by spraying regularly with "Black Leaf 40."
INEXPENSIVE—EASY TO USE
"Black Leaf 40" protection is extremely economical because a little makes so much insect-killing spray. This spray kills both by contact and by fumes, assuring maximum effectiveness. Free directions with each bottle will help you overcome your insect problems. Sold by dealers everywhere.
LOOK FOR THE LEAF ON THE PACKAGE
TOBACCO BY-PRODUCTS & CHEMICAL CORP., INCORPORATED Louisville, Kentucky
"Black Leaf 40"
"Insist on factory sealed packages for full strength.
3902

Vaughan's The Most Beautiful SEED CATALOG 240 FLOWERS IN COLOR Free!
AND INSTRUCTION BOOK
• In "Gardening Illustrated, 1939," all the new flowers and vegetables, and old favorites, are described and illustrated. Its 124 pages, 52 in color, list 2164 annuals, perennials, roses, dahlias, gladioli, water lilies, etc. Also finely flavored table-quality vegetables. Full cultural instructions, special bargains. Sent free, postpaid. Write.
SPECIAL FOR 1939: Marigold Mrs. Lippincott, loveliest of the carnation type. 2½-inch flowers with frilled petals, flaring broadly, of rich gold. Send 10c for large packet.
VAUGHAN'S SEED STORE, DEPT. 24
10 West Randolph Street, Chicago
47 Barclay Street, New York

FREE BOOK WATER GARDENS AND GOLD FISH Beldt's Aquarium
WATER LILIES
All colors; hardy, day and night bloomers; aquarium plants; complete water gardens.
Tropical & Gold Fish
Rare species; collections at reasonable prices. See them in the
FREE CATALOG IN COLORS
SPECIAL: one yellow, one white hardy lily and 2 water hyacinths. Postpaid in U. S. for $1.50.
Beldt's Aquarium 2150 Crescent Ave., St. Louis, Mo.

STRAWBERRIES
Allen's Berry-Book describes best Early, Medium, Late and Everbearing varieties. Tells how to grow big luscious berries for home and market. *Copy free. Write today.*
THE W. F. ALLEN CO.
330 EVERGREEN AVE. SALISBURY, MD.

All about the NEW ROSES
1939 EDITION NOW READY

Free Write for this helpful booklet . . . Sketches and data insure success with roses. Also 26 latest rose creations in full color. *Write today!*
JACKSON & PERKINS COMPANY
The World's Largest Rose Growers
Dept. N39 Newark, New York State

INDOORS AND OUT

(Continued from page 127)

the woodpecker by Allan Brooks, and a reproduction of an artist's portrait of the author—yet these features do add value and interest to the volume.

It is interesting to compare the rational conclusions of Professor Ritter with the intuitive suggestions of Felix Salten's work. Two examples are rather pointed: When the jay in *Perri* squawks about man, "I hate that two-legged creature," and other birds agree "We all hate the two-legged creature!", Perri observes, "But you only have two legs yourselves." And "they all contradicted at once: 'That's different!'—'There's no comparison!' —'*We* have wings!'" Professor Ritter similarly uses the structural comparison of the bird's wings and the human "arms-hands"—in other words, the specially adapted forelimbs of the two—"as a foundation for a broad comparison of bird and man in every organ and part."

In *Perri,* Felix Salten uses the magpie to express an emphasized piece of wisdom to the young squirrel: "Here's something you have to learn: it's lovely to be alive." Professor Ritter examines the connection between a folk saying about the oneness of life and another folk saying, "It is good to be alive." He finds a probable "linkage" between self-preservation and goodness of life (the very point that Salten's magpie was making), and comments: "I recognize that at bottom I share this justification with every other living thing, plant or animal, that lives now, ever has lived, or ever will live."

It is apparent that Professor Ritter's understanding of the California woodpecker, which he has acquired and now imparts to readers, is an understanding of more than a species of bird. It extends to the oaks in which the woodpeckers live, their nuts, bark, kinds, distribution, and their association with other kinds of trees; mountains, hills, and valleys; creeks and rivers; people, roads, houses; "and all the rest, that have made possible, or have been incidental to, the existence of my birds." It is significant that at the conclusion Professor Ritter testifies that in none of his many efforts to heed the Delphic oracle's injunction, "Know thyself," has he found as much satisfaction as he has in subjecting himself to a detailed and rigorous comparison with individuals of subhuman species. And to self-knowledge he adds the conceptions of self-respect and self-control.

Certainly the reading of this book will contribute to a better enjoyment of the effects of the spring equinox and a happier participation in the whole grand scheme of life under the Sun. As for this study, Professor Ritter writes on his last page, "I can only emphasize again the enrichment it has brought to my own personal life and understanding of nature," and I believe that many readers will bear similar witness—perhaps of both Professor Ritter's document and Felix Salten's story, for it seems to me that both books illuminate the common element in all living on the Earth, which as I said before seems most apparent in this season of spring.

Correspondents Wanted

Joseph Corbe of 14600 Ingalton Avenue, Cleveland, Ohio, writes that he is a member of the Cleveland Bird Club and the Cleveland Tree Club and would like to correspond with members of other similar clubs elsewhere. He adds that he is twenty-two and unemployed, "so I have plenty of time to write."

Texas Nature Federation

Officers have been chosen for 1939 by the Texas Nature Federation, one of the most active conservation groups among the states. Dr. Leo T. Murray of Baylor University is president. The other officers are Dr. G. W. Goldsmith, Texas State University, vice-president; Jerry E. Stillwell, 7460 San Benito Way, Dallas, secretary; L. G. Highnote, Dallas, treasurer. Board members are Joe M. Heiser, Jr., Houston; Paul E. Hines, Beaumont; Mrs. F. W. Miller, Dallas; Miss Mary Belle Keefer, El Paso, and L. Irby Davis, Harlingen.

Wild Country

"The book is to be a scrap-book, because it will be about nothing in particular but will touch on many aspects of the countryside in which I happen to live! I shall flit from remote islands to the deer forests and to the tops of the mountains, as fancy wills." Thus writes F. Fraser Darling in the preface (which he wrote before he wrote the text) to his attractive little book, *Wild Country.* A British field biologist, Mr. Darling has assembled many fine pictures and had many interesting wildlife experiences. This book, then, is written around some of his finest pictures, is informal and fascinating to read. It can be picked up and opened anywhere for a few moments' browsing. Published in the United States by Macmillan, it sells for $2.75.

Turtle Guide

In our February issue we reviewed the excellent *Field Guide to New England Turtles* by Harold L. Babcock, published by the New England Museum of Natural History, 234 Berkeley Street, Boston, quoting its price at fifty cents. There was no indication of the price on the publication but since it was physically similar to the earlier snake guide we jumped too quickly to the conclusion that the price was the same. It turns out to be one dollar and eminently worth it. Color plates increase costs tremendously.

Michigan Mushrooms

Dealing with the common edible and poisonous mushrooms to be found in southeastern Michigan, Bulletin Number 14 of the Cranbrook Institute of Science, Bloomfield Hills, Michigan, is a valuable addition to mushroom literature. It is the work of Alexander H. Smith of the University of Michigan. Starting with a general discussion of mushroom characteristics, the text pauses to suggest some recipes and then proceeds to discussion of the species. Plates supplement the text and will aid in identification. Copies, paper-bound, are available at fifty cents; cloth-bound, one dollar.

For Travelling Gardeners

We have received, not infrequently, letters from members asking for suggestions as to where they may find spots of particular floral beauty. This has been a question heretofore difficult to answer. Now our problem is solved with the publication by Hale, Cushman and Flint of *The Gardener's Travel Book.* The work of Edward I. Farrington—which is sufficient guarantee of its value to garden lovers—this is the first real attempt to provide a guide to places of horticultural interest for the whole United States. State by state, in alphabetical order, Mr. Farrington tells you where to find the outstanding in gardens, public and private, and gives all other pertinent information, such as visiting restrictions and sources of additional data. For the garden lover who roams about this will be invaluable. The price is $2.50.

Botanic Garden Popular

A marked increase in the number of visitors to the New York Botanical Garden during 1938 is registered in the annual report of Dr. William J. Robbins, the director. A thirty per cent increase in attendance at the courses in gardening and the free weekly lectures was also recorded. Increased plantings were made during the year, and the Garden now has open the new tropical rain-forest house, the tropical fern house, three houses of cactuses and other succulents, two floral display houses, one of which has been arranged as a spacious indoor garden.

Photographs Wanted

The zoological staff of the Federal Writers' Project of New York City is preparing a book on the natural history of the United States and needs pictures. Since, however, there are no funds for the purchase of illustrations, appeal is made to amateur photographers of Nature to submit pictures for the glory only. Credit will, of course, be given. Pictures should be sent to Ralph DeZola, 110 King Street, New York City. Zoo pictures are barred and habitat shots desired.

A FEATHERED CALEB

by Edith Carpenter

One day in the early summer of 1938 the little town of Hague, on the shores of Lake George, was startled by a new bird melody, something entirely different from any heard in that locality before. Natives, taking note, asked one another what this strange bird might be. The song first reached my ear on the fifth of August, a strange cadence out of the gloom of an approaching thunder shower. All summer the bird remained an enigma, concealing himself in roadside thickets and breaking into song at unexpected times, but eluding all efforts to observe him. No afternoon was too stifling for a bit of his warble, but not until October, when he ventured out from among the falling leaves to seek insects from the posts of the chicken yard did his ruddy back, buff breast, white line over the eye, wren-like markings and size reveal his identity. He was a Carolina wren! To see this bird of the Upper Austral Zone, with no previous record (so far as we can learn) farther north than southern New England and the vicinity of Ithaca, N. Y., here in the foothills of the Adirondacks was indeed surpris-

ing. From how far had he come and what had lured him? Had he been sent, like Caleb of old, "a scout to spy out the land?"

The nights grew sharp with frosts, still he stayed on. January came, bringing sixteen-below-zero cold. Days of silence ensued when we feared he had succumbed, but the return of milder, sunny mornings brought, if not a snatch of song, at least a sort of cawing call-note to reassure us of his presence, until, with the lengthening of the days in February, his melody began to be frequent once more and his repertory increased until he became the joy of the village, ungladdened as yet by any venturesome robin or song sparrow. Ears unfamiliar with the notes of Carolina wrens marked every new turn in the song, the change from two to three syllables, the occasional reversing of the accent. "Worship! Worship!" he seemed to command on a Sabbath morning. "See your liver!" rang his astonishing admonition outside windows of a spring dawn, but though he waked up would-be sleepers, all loved him and he became the subject of many a conversation. An inquisitive fellow, he poked into all sorts of apertures and inside buildings in his search for insects, and upon one occasion got himself shut inside our greenhouse. As he fluttered, frightened, against the glass, my husband, anxious to "look the little stranger over", tried to catch him in his hands. Back and forth he flew; was cornered, only to disappear and reappear in another place. Any moment expecting him to be hurt, I watched him vanish beneath the benches among some empty boxes. But while we stood peering for the "bird with the broken wing", suddenly and saucily from the hillside came the taunt, "Gibberish! Gibberish! Gibberish!" Was he really bird at all or just a merry sprite, a sort of avian Puck?

On his morning rounds about the village he discovered, one day, a pan of partly-cracked butternuts on the porch railing and, by his regular visits thereafter at daybreak or evening, demonstrated a growing taste for supplementing his insect diet with these tid-bits, at which he picked hard with his long, sharp bill, from this angle and that, like a nuthatch, until he extracted them. We always kept a supply cracked, but if they were forgotten he scratched and poked noisily about, searching among the empty shells. Finely-cut cashew nuts were also devoured with relish. Often upon alighting, and before eating at all, he just sat in the pan and sang. All summer, so far as we could determine, he remained mate-less. Toward the end of August, losing some of his vividness of coloring and trimness of appearance, he seemed to go into a moult, but later regained his good-looks, and we twice photographed him from the window, as he perched on the pan. Wiser from one year's experience, the prospect of another winter in this northern country must have daunted him, for near the end of October, after fortifying himself for two days with four and five gorgings daily at the nut pan, he suddenly came no more, nor was his song heard again. The day of cold north wind which followed his two days of feasting doubtless bore him southward to a balmier clime more suited to Carolina wrens, but how we miss him! When the warm May days of 1939 come will he perhaps return with a mate to gladden the village once more, and establish his home among us? We hope so. The dish of nuts will be waiting.

CLASSIFIED ADVERTISING

BOOKS

BIRD BOOKS

"Adventures of a Bird Watcher" by Bert Dayton. A delightful, readable and instructive book by an author of thirty years' experience in bird watching. A $1.50 book (illustrated partly in color). If ordered direct before April 15th, prepaid for $1.00.
Palisade Press, 280 Broadway, New York, N. Y.

BOOKS ON FORESTRY

FOREST FACTS FOR SCHOOLS

336 pages, 34 illustrations, cloth bound. Book for pupils in Grades 5 to 12. Exercises and new-type tests follow each division of the text matter. 80c

FORESTS AND MANKIND

250 pages, 66 cuts and illustrations, cloth bound. Convincing knowledge of the importance of the forests in their historical, social and economic relation to mankind. $3.00

TREES AS GOOD CITIZENS

268 pages, 16 full color plates, 125 other illustrations, cloth bound. This book tells the whole story of the shade tree. $2.00

NATURE BOOK DISTRIBUTORS
1214 16th Street, Washington, D. C.

BUTTERFLIES

20 LIVING Cocoons including Luna $1.00, 25 Peruvian Butterflies $1.00, 20 Brazilian Butterflies $1.00, Giant Moths, Attacus, Atlas, $1.00. Actias Isis $1.50, Eacles Imperialis 35c each, Luna Moths 25c each or $2.00 per dozen. **Butterfly World Supply House, 297 East 98th Street, Brooklyn, N. Y.**

COCOONS; the original $1.00 dozen including Luna, 10; others 50c dozen up. **MAYNARD, 1192 Lewiston, Rochester, N. Y.**

COCOONS THAT CAN'T BE BEAT
A Trial Will Convince You
Write today: Catalog Free
NATURE'S SUPPLY HOUSE
Platteville, Wis.

FILMS DEVELOPED

IMMEDIATE SERVICE!—Better Pictures. Sixteen guaranteed prints from roll 25c. One colored or two Plain Enlargements and 8 guaranteed prints 25c. Sixteen reprints only 25c coin. ONE Day Service! Details and Film Mailers FREE on request. **AMERICAN STUDIOS, Dept. M, La Crosse, Wisc.**

HELP WANTED INSTRUCTION

Forest Jobs Available $125-$175 month. Cabin. Hunt, trap, patrol. Quality immediately. Write **Rayson Service, C-19, Denver, Colo.**

HORTICULTURAL

RHODODENDRON MAXIMUM, Mountain Laurel, Holly, Azalea, Hemlock and Dogwood. 8"-18", 50 for $1.35; 100 for $2.50. 2-4 Ft., 10 for $1.50; 25 for $3.00; 100 for $10.50. **AZALEA FARMS, Doeville, Tennessee.**

WILD FLOWERS—Ornamental shrubs—Azaleas. Catalogue. **THREE LAURELS, Marshall, N. C.**

INDIAN CURIOS

PREHISTORIC AND EARLY Modern Indian Relics, Old Arms, Fossils, Minerals. Illustrated lists ten cents. **N. Carter, Elkhorn, Wisconsin.**

100 Good ancient arrowheads $3.00; Tomahawk head 50c. Flint knife 25c. Illustrated catalog 5c. **H. Daniel, Hot Springs, Arkansas**

INDIAN Relics, beadwork, coins, minerals, books, curios, weapons, dolls, old glass. Catalog 5c. **Indian Museum, Northbranch, Kansas.**

PETS

FLYING SQUIRRELS—Raise them for pets, profit, pleasure. Mated pair and booklet $3.00, safe delivery anywhere guaranteed. **Wildwoods Fur Farm, Woodville, Texas.**

PHOTOGRAPHY

NO more wasted film or unnecessary expense. Take pictures you can be proud of. Sell to magazines and newspapers. Make good money wherever you live. Easy, low-cost home study course shows you how! Free Catalog. **UNIVERSAL PHOTOGRAPHERS, Dept. C, 10 W. 33 St., N. Y. C.**

SCIENTIFIC

TELESCOPES, Microscopes, Binoculars; 1939 bargain catalog free. **Brownscope Company, 5 West 27th Street, N. Y.**

CHEMISTRY, Mineralogy, Microscopes, Telescopes, Binoculars. Catalog Free.
Tracey Laboratories, Evanston, Illinois.

SEA SHELLS

EIGHT different large interesting shells from the Amazon River, Brazil. $2.00. Free catalogue. **SEA SHELL HOUSE, 1611 S. Elena, Redondo Beach, California.**

SHELLS OF THE WORLD

HANDBOOK for shell collectors, 2200 illustrations, descriptions, values and much other invaluable information $2.50. Smaller edition 650 illustrations $1. Ocean and Land Shells (USA only), 650 illustrations $1. My stock of shells for sale is the largest in the world. 25,000 species, 250,000 specimens, all at modest prices. In making inquiry, state definitely what you collect. **Walter F. Webb, 202 Westminster Road, Rochester, N. Y.**

SONG POEMS WANTED

WANTED: original poems, songs, for immediate consideration. Send poems to **Columbian Music Publishers Ltd., Dept. 161, Toronto, Can.**

SQUABS

WHY ordinary trade? Receive squab prices. Thousands wanted daily. Write **Rice Farm, Box 804, Melrose, Mass.,** for free secret-revealing book.

TAXIDERMY

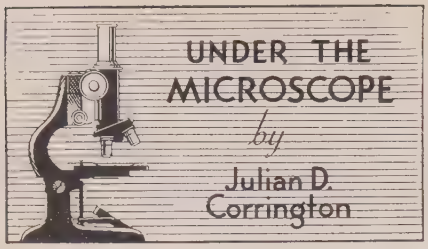
GLASS Eyes, taxidermists', furriers' supplies. Big catalog free. **Elwood Company, 223 Smith Bldg., Omaha, Nebr.**

TAXIDERMY SUPPLIES—QUALITY Artificial Eyes, Teeth, genuine Jonas head forms. Tools, materials, etc. Everything for the progressive taxidermist. Send 10c for big illustrated catalog. **Jonas Bros., 1023 Broadway, Denver, Colorado.**

WILD FLOWERS

IN COLORS—60 post cards, 25c doz.; 64 2 x 3 in. stickers 55c; book of 365, $3.95; 50 lantern slides & lecture rented 1 day $3.75 & postage. Books, slides or photos (7000), movie films, seeds. Membership & magazine $1.50 a year; Junior Chapters of 25 or more 10c per member. **Wild Flower Preservation Society, 3740 Oliver St., Washington, D. C.**

PLEASE MENTION
NATURE MAGAZINE
When Writing Advertisers



Staining Slides

Following the cutting of sections, described in the February issue, the next step in microtechnique is staining, a fascinating art and one not difficult to master. Reasons for staining are well brought out by two contrasting photomicrographs, shown herewith, in which an unstained and a stained section of the same material are compared. Uncolored tissue is almost transparent and various parts, such as cell walls, nuclei, fibers and the like transmit light so nearly uniformly that no contrast is afforded and details are imperceptible or obscure. Using various dyes affects unlike structures differently, and they absorb or transmit light rays in varying manners and so give to the eye a picture in which all parts stand out clearly differentiated.

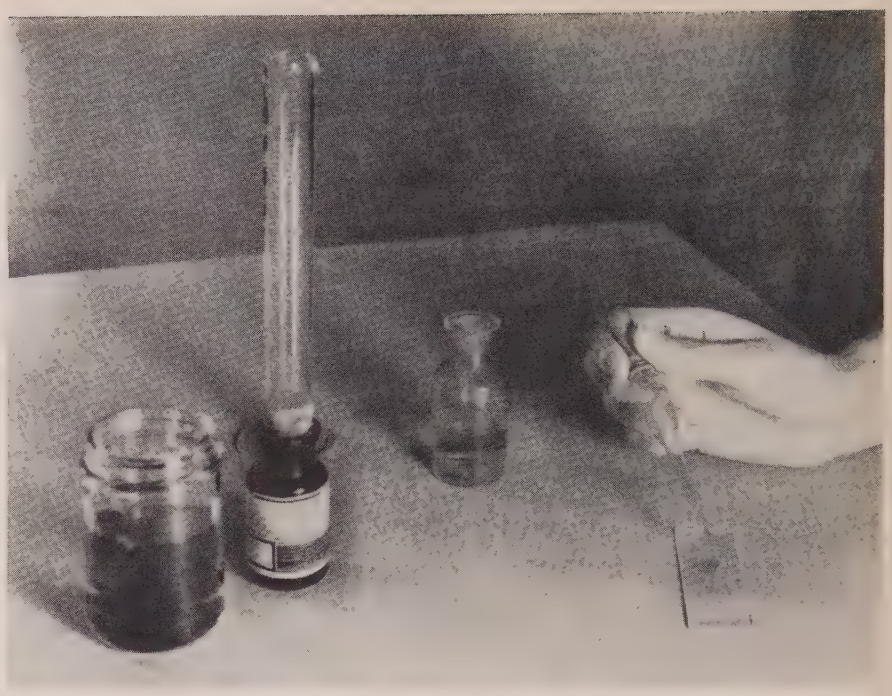
The number and kinds of stains employed in biology are legion, as are the various formulas and techniques recommended by different workers. New procedures are constantly being discovered and recommended, to the extent that a professional journal, *Stain Technology,* is published in this field. Most of these are for special cases or research problems, however, and there remain a few time-tested and standard routine techniques, applicable to the great majority of cases. It is these we are to discuss first, leaving special procedures for later issues.

The apparatus used may be as simple or as elaborate as one chooses. If only a few slides are to be stained and only occasionally, there is no need to stock up with a large equipment of glassware. One of our photographs this month shows an operator adding stain to a slide with a pipette, and this method will serve in most cases. Where numbers of slides are to be run through the technique frequently, special staining jars, such as the Coplin jar, would be time-saving essentials.

The preferred routine technique with such botanical items as sections of root, stem, leaf and bud is the *safranin-light green* method, according to the following schedule:

One of the best general fixing agents for plant material is formol-acetic alcohol. Cut short pieces, not more than one-half inch in length, of a green plant stem (for example) and fix for 24 hours, or longer if some other time would suit your personal schedule better, since it is almost impossible to overfix in this reagent. Wash for 24 hours in several changes of 50% alcohol, then complete the dehydration, imbed in paraffin and section (see preceding issue).

Place one very tiny drop—such as is delivered by the small end of a toothpick—of Mayer's albumen fixative in the center of a thoroughly cleaned slide, and with the ball of the right forefinger (likewise well cleaned) wipe this drop the length of the slide, both directions, and continue to wipe gently until the whole surface of the slide has been covered and there remains a scarcely visible film, uniform all over. Place slide flat on table and flood with water, then with a camel's hair brush or section lifter transfer a cut section to the center of this slide and float section onto water. The slide should now be gently warmed, as on a slide-dryer, or over heat from any source not great enough to melt the paraffin. This evaporates the water and pulls the section tightly down into the albumen film, at the same time the paraffin flattens out smoothly. Be sure that the section is centered and properly oriented on the slide before all of the water has gone, as after that it is too late to change the position. Place slide away in a dust-free situation to dry thoroughly for 24 hours.



DROPPING STAIN ON TISSUE WITH A PIPETTE

TWO SECTIONS OF ONION ROOT, THE ONE ABOVE UNSTAINED AND THAT BELOW STAINED. SLIDES FROM WARDS

Meanwhile prepare the stains, a 1% solution of safranin in 50% alcohol and a 1% solution of light green in 95% alcohol. These may be purchased ready-made if desired, but it is more economical as well as a part of every microscopist's training to make them up one's self. The dry stains are sold in powder form in 10 gram bottles, and a 1% solution is made by taking 1 gram of the dry stain and dissolving in 100 cc of the solvent. This involves apparatus for both weighing solids and measuring liquids, and while the first case requires a balance and weights, the second needs only a graduated cylinder, an inexpensive item illustrated in the photograph herewith showing staining with a pipette. If you plan but little of this work and prefer not to invest in a small balance, have stains weighed out for you at your druggist's.

Now place the slide with tissue affixed in xylol for 10 minutes, then in each of the descending series of alcohols (hydrating) for one minute each, beginning with absolute alcohol, then 95, 83, 70 and 50%. If absolute alcohol is not available, go from xylol to carbol-xylol for 5 minutes, then into 95% alcohol and so on down to 50%. Next place the slide in a small glass or jar of narrow and tall form, with enough of the safranin stain to cover the tissue. The Coplin staining jar is especially designed for this purpose, but a small cheese glass will serve well. Stain for 24 hours, an unusual length of time as staining goes, the aim being purposely to overstain, since the second stain (counterstain) and the alcohols used in dehydrating will remove much of the safranin and so one must start with an excess.

After the 24 hours of staining in safranin, rinse the slide in 50% alcohol by waving it slowly and gently in the vial for not more than half-a-minute, then place flat on table and add the light green with a pipette, as illustrated, for not more than thirty seconds. The length of time of this second stain must be determined by trial for the particular

Formol-Acetic Alcohol, standard fixer for higher plants:

Formalin, full strength commercial	5 parts
Glacial acetic acid	5 parts
Fifty percent alcohol	90 parts

Mayer's Albumen Fixative, for affixing cut sections to slides:

Beat up white of one egg with egg beater and pour into tall cylinder, such as a graduated cylinder. Let stand until all suspended matter rises to top, then skim this off. Add to remainder an equal volume of glycerin. To every 50 cc of this mixture add one gram thymol crystals or salicylate of soda to prevent spoiling. Place in stoppered bottle.

tissue; sometimes as short an interval as 5 seconds is sufficient. Rinse rapidly in 95% alcohol and absolute alcohol, then into xylol (or from 95% through carbol-xylol) for 5 minutes, then mount in balsam.

A first-class slide should show brilliant contrast of red and green, with neither stain too dense nor too faint. Varying the time of rinsing and dehydrating will control the depth of staining with safranin; while with the green, vary the time of actual contact with the stain. We will be glad to criticize any such slides for you if you will send them in a suitable container, such as the small pair of wooden enclosures used for this purpose and obtainable from dealers, and include sufficient return postage.

Announcing the American Society of Amateur Microscopists

Those readers who are interested in our proposal to organize amateur microscopists into a society and have manifested that interest by sending in their questionnaires will be glad to know that their patience is about to be rewarded. The five months of delay since the first announcement in the issue of October, 1938, is regrettable but seems to have been unavoidable since questionnaires were so slow in coming in. Even now we have no more than a nucleus, about 200 at this writing.

Two hundred will do for a start and it is up to these organizers to maintain their interest and to bring in others, with the hope that the Society will, in the course of a few years, grow to sizeable proportions and thus be able to finance more ambitious undertakings than will be possible at the beginning. Great oaks have a habit of springing from little acorns, 'tis said. It must be understood that if interest lags instead of gaining momentum, the Society will be terminated.

Among the first acts that your editor proposes are the following: 1. Select an appropriate emblem. 2. Adopt an official constitution. 3. Elect officers for the first year. 4. Send in your fifty cents annual dues. 5. These four once accomplished, we can go ahead with the design and printing of a suitable certificate of membership, which will bear the insignia and official signatures. Such certificates will be sent to all of the then members in good standing and these will automatically become the Charter Members, their certificates so stating.

As soon as a plus condition of the treasury warrants the necessary outlay, members will receive mimeographed material with plans for exchanging ideas and slides, lists of members in all the larger centers, hints on the organization of local chapters, and other features. Keep in mind that the Society is to be self-sustaining, hence we will all get out of it what we put into it and this means cooperation, with everyone doing his or her share.

In order to activate these proposals, will those readers who have some artistic ability kindly try their hand at designing suitable insignia, using pen and ink on white card, and send in one or as many devices as desired? If you can't draw, but have some ideas, write them out. The best sketch will be used as submitted, or perhaps several of the better ideas will be pooled.

Since the group is as yet unorganized and someone must take the initiative, your editor proposes to appoint a nominating committee from prominent persons whom he knows to be interested in the success of any undertaking dealing with microscopy. This committee will submit a slate of names, and members (tentatively, those who have sent in questionnaires) will be asked to ballot on this slate. In future years, some more satisfactory method of conducting elections will be incorporated in the constitution. If you know of anyone whom you would like to suggest for any office, please send in the names and addresses promptly, and the nominating committee will consider each such entry.

We suggest that officers be limited to a President and three Vice-Presidents, representing respectively the fields of biology, inorganic microscopy (optics, chemistry, mineralogy, metallography, photomicrography) and industrial microscopy. The editor of this department in NATURE MAGAZINE will act as Executive Secretary, which is a polite way of referring to the goat who does most of the work, conducts the correspondence, handles the funds, publishes the Bulletin and otherwise manages to keep his desk loaded up with work. Send in a vote on this point about officers.

What should be in the constitution? Send in suggestions. Presumably there will be the

For the Gardener

Handiest power mower ever built—only one with easy one-hand control—cuts 18" swaths; mows large lawns in quarter of time for only 5c fuel cost. Quiet, easy starting 4-cycle motor; adjustable cutting heights; rubber tires. Easy terms. Model "D" $110, Model "S" shown, $79.50

EVINRUDE LAWN-BOY

DELPHINIUM ARISTOCRATS

"DREAMS OF BEAUTY" HYBRID—The dependable Hybrid. Mildew and heat resistant. Gorgeous shades of lightest blue to the deepest Gentian blue; some have pink fillings; some orchids; many doubles.

Thrifty blooming size; 12 for $1.00; 30 for $2.00
Large 2 yr. field-grown: 6 for $1.00; postpaid.

CHINENSIS "CAMBRIDGE BLUE"—A branching type. Grows 2' to 3' in height. Flowers of brilliant velvety blue. Stay in bloom longer than other Delphiniums.

Blooming size; 20 for $1.00; 50 for $2.00
Large 2 yr. field-grown; 6 for $1.00 postpaid.

ELATUM "ICEBERG"—The pure white strain. Strikingly beautiful in the garden. Ideal for cutting.

Large 2 yr. field-grown; 4 for $1.00 postpaid.

Descriptive catalog of perennial and rock plants, listing over 200 varieties, on request.

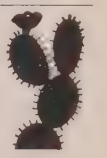
HEREFORD'S GARDENS
Oakford - - - - Illinois

KINKADE GARDEN TRACTOR
and Power Lawnmower

A Practical Power Plow and Cultivator for Gardeners, Suburbanites, Florists, Truckers, Nurserymen, Fruit Growers

Low Prices - Easy Terms
American Farm Machine Co.
1036 33rd Av. SE. Minneapolis, Minn.
Catalog Free

New CACTUS



Grow these wonderfully interesting and beautiful flowering plants. Write for my new *Free* catalog, 16 pages of colored pictures and descriptions. A fascinating hobby for the window gardener or apartment house dweller. Grow anywhere! Johnson Cactus Gardens, Box 61-B, Hynes, Calif.

CAMELLIA JAPONICAS from the South's finest collection. 4 one-year-old pot-grown plants $2.00—white, variegated, pink, red. Cultural directions free with each order.
FRUITLAND NURSERIES, Box 910-N, Augusta, Ga.

PLEASE MENTION
NATURE MAGAZINE
When Writing Advertisers

Interested in the Stars?

Broaden your scope of understanding beyond our own little world; reach out for information about the universe; it's interesting and only a little complicated. The earth rushes through the solar system at an amazing speed. Every night we have new neighbors, some familiar friends, others, with a distant mysterious look, challenging identity.

The Handy Star Finder

Excellent and accurate device for amateur astronomers, size 10½ x 10½.
$1.00 (postpaid)

The Junior Star Finder

A pocket star finder for the novice, 6 x 6.
Only 25 Cents (postpaid)

Own a star finder and you are behind the scenes of this year's heavenly displays. Have at your fingertips a mirror of the sky for every hour of darkness.

Send Your Order Today

NATURE BOOK DISTRIBUTORS
1212 16th St., N.W. Washington, D. C.

POWERFUL ULTRA VIOLET and BRILLIANT FLUORESCENCE with our NEW LAMP

Plugs directly into 110-120 A.C. or D.C. 50 Hour Lamp (300W), $2.00; 200 Hour Lamp (325W), $3.00; 500 Hour Lamp (500W), $4.00.
(plus postage for 2 lbs. your zone)
No Filter Required. Safe To Your Eyes.
Fluorescent Bulletin, C2 .....10c

HARRY ROSS
Scientific & Laboratory Apparatus, 69 Warren St., N.Y.C.

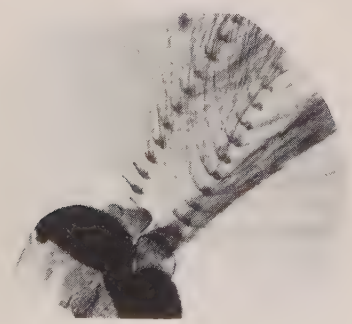
usual statements as to the name of the Society, its purpose, membership, officers and insignia; how the constitution may be amended; rules on voting; perhaps other items—though we should keep it as simple and as flexible as possible. Meetings are out of the question for some time to come.

Shall we limit membership in any way? Your editor advises not. We have some interested members from Canada and Latin America and there is no reason why membership should be restricted in any way geographically. Nor can we see any reason to bar professional microscopists if any are interested enough to wish to join. So long as the primary aims shall be to serve the amateur, we should welcome the assistance of those whose profession centers around the microscope. Perhaps we should have a clause that members must be twelve years of age or over? One member thinks we should have junior and senior members, but such distinctions would be difficult to maintain in so loose an organization. However, all of these points are up to you. Vote!

Send in your dues at any time—the sooner the better. Use checks or money orders payable to Julian D. Corrington, or send coins at your own risk, in the proper card holder. If more convenient, send one dollar for two years' dues—just as you prefer.

According to a few of the questionnaires submitted, some members have the mistaken notion that the Society will immediately begin the publication of a magazine devoted to amateur microscopy. How impossible this would be can be determined if you will ask someone in the publishing business to tell you a bit about the costs of printing and production of even the simplest form of journal. We will do what we can, however, with mimeographed bulletins, and for these we will need material submitted by members; your editor could not and should not do it all. So get busy, if you have ideas or pet gadgets, and give your fellow members the benefit of them.

If you are among the many who have not yet sent in a questionnaire, drop a postal card to Dr. Corrington, in care of NATURE MAGAZINE, and request a copy, meanwhile looking up the proposal announcement in the October, 1938, issue. We need more members, so get behind this movement and help keep the ball rolling—or perhaps we should say, keep the microscope focused.



Photomike Contest

Winning picture for March is a view of the head of a male mosquito, sent in by O. H. Lovejoy, head of Department of Biology of Paseo High School, Kansas City, Missouri. This photo was one of several sent to show what his biology students are doing with a simple type of apparatus that we have asked him to describe for our readers in an early issue. An ordinary laboratory microscope and simple box camera were used, with an exposure as brief as one five-hundredth second—a fast snapshot, easily made just as one takes any regulation snapshot. Taken on verichrome film; lighting cool but brilliant, the light unit being housed in a small box attached at the bottom of the microscope and supplemented with a battery of lenses secured from the ten-cent store.

Photographically the picture is excellent. Our only criticism concerns the composition; it would have been better to show the complete antennæ and mouth-parts.

Runner-up position was taken this month by Samuel Sperling, Brooklyn, N. Y., for a cross section of a 36-hour chick embryo through the developing heart, and third place goes to Ralph D. Cornish, Bridgeport, Conn., for head of a flea. This picture might have captured the prize save that the subject has been overworked. Contestants should keep this point in mind for the future; choose some subject that has not appeared frequently before.

Trade Notes

The Spencer Lens Company, Buffalo, N. Y., has just issued a most useful and instructive sheet of correct size and punching for inclusion in a loose-leaf notebook. On one side is a labeled photographic reproduction of a microscope to show mechanical features, together with the method of calibrating micrometer discs for eyepieces. On the reverse is another fine photograph, showing a sectional view of a microscope, with the path of light rays, together with a temperature conversion table and a six-inch rule with both inches and millimeters. This sheet is a splendid addition to your microscope notebook. Send a three-cent stamp to this department for your copy, asking for Spencer sheet M.

* * *

Harry Ross, who buys, sells, repairs and exchanges all sorts of scientific equipment, including microscopes and accessories, has moved to new quarters. His new address is 69 Warren St., New York City.

* * *

Among the most useful reference works directly connected with our subject is *The Use of the Microscope*, by the late John Belling. This volume of 315 pages takes up operation of the different kinds of microscopes, lenses, condensers, illuminants and filters; discusses drawing and photomicrography; rules for use and care of microscopes; tests, practical exercises, history, literature and a fine glossary.

Here is a manual written for *students* of the microscope, including optics, and is definitely not to be undertaken by the beginner or those with insufficient background. On the other hand, for those who can read it with profit or who are engaged in research work involving microscopy, this book makes a splendid addition to the working library. McGraw-Hill Book Co., Inc., 330 West 42d St., New York City. $4.00.

* * *

How's your math? Are you up to handling analytics and such? If so you could study with profit one of the famous and successful books on the optics of the microscope, a small and compact volume of 264 pages and 217 figures, *The Microscope, Theory and Practice*, by Conrad Beck, a new (1938) edition combining the author's previous works under one cover. For those who can comprehend formulae and understand mathematical writing we advise this illuminating work, dealing with such subjects as geometric optics, photometry, aperture and resolution. R. & J. Beck, Ltd., 69 Mortimer St., London W. 1, England. 7s. 6d.

* * *

If you haven't seen one of the New Plan Texts by the University of Chicago Press, you have a surprise and a treat in store. Radical and beautiful and modern, these books seem to your editor to have solved the old problem of sugar-coating the educational pill so that students can be led to water and also made to drink. He who could pick up a copy of Ralph Buchsbaum's *Animals Without Backbones* and merely leaf it through idly is indeed beyond intellectual reclaim. We tried to do just that, since the postman arrived with the book just when we were in a tearing rush. Two hours later an exasperated lady-of-the-household (known to census-takers as "housewife" and by herself dubbed "fishwife") remarked that this was the last time she would mention dinner and that the editorial stomach could go unnourished unless—. So, with a sigh, the new treasure was put aside, but only for the dinner hour. There are over 550 superb illustrations; gorgeous new drawings by the author's sister, Elizabeth Buchsbaum, and such photographs as you have seldom seen before outside of the covers within which you are now reading, for quite a number are reprinted from NATURE MAGAZINE. Rotogravure is the answer which has permitted such lavish use of picture without a prohibitive price. The text reads like a fascinating story and yet there is no absence of meat; the difficult facts of invertebrate zoology are not pollyanna'd in an attempt to make the book "easy"; yet easy it is because of the writer's excellent style and choice of wordings. Take our word for it, you will vastly enjoy this fine volume. University of Chicago Press, 5750 Ellis Ave., Chicago, Ill. $3.75.

* * *

In the October, 1938, issue of *The Journal* of the Quekett Microscopical Club, London, England, appears a very fine article on *Microscopic Science in Holland in the Seventeenth Century*, by F. J. Cole, F. R. S. Leeuwenhoek, Swammerdam and Ruysch are critically discussed in a most interesting fashion, the article covering pages 59-78 and including five plates and manuscript from Swammerdam's *Biblia Naturae*. If you enjoy readings in the history of science in general and the microscope in particular you will want to look up this number at the nearest library having a subscription to this important British publication.

* * *

Under the Microscope is a department of NATURE MAGAZINE designed for those readers interested in microscopy and maintains a service to render assistance with problems in this field. You are invited to take advantage of this service. Address all inquiries to Julian D. Corrington, NATURE MAGAZINE, 1214 Sixteenth St., N. W., Washington.

A Parish in the Pines

Lois D. Hagen, the author, was born and grew up in the Lake region of northern Minnesota. Her father, William Denley, born in England, had felt the call to be a missionary, and took to his field of work little training for so hard a life save dogged perseverance. With a brother born in England, and two younger sisters, Lois followed the parents in their several moves, each one more remote from the life that the gently-reared mother sometimes sighed for.

Thrown among the Indians, for whom the missions were established, the family soon overcame their instinctive fear of the red man, and found among the Chippewas some of their warmest friends. Indeed, as appraised by the author, these people stand well in comparison with the invading race in worth-while qualities and abilities. For the brave family whose daily life is detailed, the thoughtful reader will render a debt of gratitude, for of such as these were the pioneers of our West. The book forms a valuable chapter in the history of our frontier.

A Parish in the Pines by Lois D. Hagen is put out by the Caxton Printers, Inc., Caldwell, Idaho at $3.00. E. A. P.

It's About Time

America Begins Again is the title that Katherine Glover gives to her book on what we have done to our natural resources, and what steps are being or should be taken to conquer waste in natural resources. With a foreword by Stuart Chase, this book is a complement to his *Rich Land, Poor Land*. Necessarily this volume skims the surface of a wide and complicated subject—Conservation. It establishes the intimate relationships of our non-renewable natural resources in a way and in terms that should fit admirably into the social studies courses in high schools, or into conservation courses where these are now given. Published by Whittlesey House, McGraw-Hill Book Company, the book sells for $2.75.

Field Bird Manual

For the student ornithologist Olin Sewall Pettingill, Jr., of Carleton College has prepared *A Laboratory and Field Manual of Ornithology*. Published in loose-leaf form by the Burgess Publishing Company of Minneapolis, Minnesota, this manual is designed for use either in a college or summer school course in ornithology, and implies the background of a course in general zoology or biology. Copies sell for $1.70 each.

Another Elm Enemy

We thought the Dutch elm disease was enough, but our American elms are faced with another epidemic killer—a virus disease. It is first evidenced by shriveling and brittleness of the leaves and is followed by rotting of the roots and inner bark of the trunk. In a few months the tree may die, as have thousands in the middle and lower Ohio Valley. The Bureau of Plant Industry is searching for a remedy, but the cause, being a virus, is elusive.

This Summer-Visit NATURE'S WORLD'S FAIR— YELLOWSTONE PARK

Travel in Comfort and Safety by TRAIN

Go in one Gateway—out another—
NORTHERN PACIFIC
serves all principal entrances

NATURE has assembled wonders of the world in Yellowstone Park. Strange sights (boiling pools, steaming geysers, churning Paint Pots) . . . scenes of breathtaking beauty (the glowing rainbow-hued Grand Canyon of the Yellowstone against a backdrop of mountains and forests)...flowers...friendly bears and other wild animals! Where else in the world could you fill a vacation with so much to see and remember?

Experience *two* of Yellowstone's unforgettable Gateways instead of one! On the Northern Pacific Railway you can go in one gateway, out another! Choose the new, spectacular Red Lodge "Sky Ride" over the Bear-tooth Rockies . . . Gardiner Gateway via Paradise Valley and Yankee Jim Canyon . . . or the famous Cody Road with its 80 miles of thrills. The Northern Pacific serves all three!

Enjoy the cool, clean comfort of an air-conditioned *through* Pullman on the Northern Pacific to Yellowstone . . . for the vacation of a lifetime!

For free literature and full information, address E. E. Nelson, 273 Northern Pacific Railway, St. Paul, Minn.

NORTHERN PACIFIC
YELLOWSTONE PARK LINE

THE Air Conditioned NORTH COAST LIMITED
1000 Miles of Mountains

Include Yellowstone in your trip to SAN FRANCISCO EXPOSITION *this summer.*

Camera Trails

BY NORRIS W. HARKNESS

"ALERT"—A LEICA PHOTOGRAPH BY GEORGE WALDHEIM FROM THE FOURTH INTERNATIONAL LEICA EXHIBIT

The Dark-Room on the March

The Nature photographer makes many pictures on outings and camping trips that he cannot hope to retake if something goes wrong the first time. Often the trip cannot be repeated, but if he can learn of the trouble before he moves on to another camp, he can, in many cases, get the shot again. This requires the development of the negatives in the field, and the outfit here described contains the minimum equipment for this part of the dark-room work under any conditions where a supply of water is available.

Since we shall be using negative material that requires absolute darkness during development, there is no reason for a safe-light, and the film can be put into the tank in the changing bag. The bag may also be used to load film into casettes or holders, and the entire film handling can be done in bright sunlight if it is necessary. Two words of caution about the bag: get one that is a little bigger than you feel is necessary, and keep it as clean as you can. A dirty bag will surely result in spots and holes in the negatives, and one that is too small will add tremendously to the time needed for each operation.

We use the metal tank for several reasons. It is lighter, less easily injured, and quicker to dry than the other tanks, but the bakelite ones are excellent and, if you have one, it will do the work just as well in the field as in the greater comforts of the dark-room.

Bottles for solutions are a problem for the user of miniature cameras who must carry the finest grain developer he can. Our kit contains two one-quart preserve jars with the glass tops. One holds the developer, and the other is for the hypo, which we carry in the convenient half-pound packages. When we are using the larger camera, we take along the Tabloid Fine Grain developer in "pill" form, and mix the solutions as we want them. The gadget box holds a tested thermometer, and it, with a viscose sponge, a few film clips, and our watch, completes the outfit.

We had an old knapsack that held the dark-room and the other photographic accessories, but we discarded it in favor of what might be called a blanket-roll. The tank and the solution bottles are wrapped in old towels that will serve in the field to dry the tank. The round bundles are wrapped in a long roll in the changing bag and a canvas cover that once was a cheap golf bag covers and holds everything securely. A shoulder strap helps to keep things from rattling together and helps with the carrying. The whole works weighs about four and a half pounds, plus whatever amount of hypo seems to be needed. When the developer is carried ready to use, the weight goes up, of course.

One other thing needs to be remembered in using the changing bag: be sure everything you may need is in it before you open up the films. Not long ago, we had put a roll of film into the tank before we discovered that the tank top was lying nearby. We did succeed in getting away with it that once by pressing the top edge of the tank with the film inside hard against the ground while our companion opened the bag and put the top inside, but it is not a practice to be preferred.

In using the dark-room to load cut-film or plates, we must practice enough to be able to work systematically. The holders should have the slides turned right side out and be piled at one end of the bag, while the box of films is at the other end. Open the box, being careful not to tear off little pieces of paper that might—and probably would—lodge on the film, and remove one piece of film at a time, putting it in the holder and closing the slide before the next film is taken out. Pile the filled holders in the center of the bag. In unloading holders reverse the procedure, beginning with them in the center and placing each exposed film in the box before taking the next one from its holder. If the development is to be done at once, the films may be put into the tank directly, and after they are all in place and the top is on tight, the bag may be opened and the solution may be poured into the tank in the light. Naturally we shall check the temperature and time the development carefully. When the development is complete, the solution is poured back into its bottle and the tank filled with hypo. The washing will be thorough if we fill the tank with clean water eight times, allowing the water to remain two minutes each time. Swabbing the film with the viscose sponge and hanging it by the clips will be done as at home. If our wash water is not too clean, it will be good insurance to replace the film in the tank when we get home and wash it for five minutes in our regular water supply. Negatives so developed should be exactly like those done at home, and inspection of them before we leave camp will enable us to check our exposures and the other details of the shot before it is too late.

The traveling dark-room, then, consists of: 2 solution bottles, the tank to fit our size and kind of film, the changing bag, the thermometer, at least two film clips, a viscose sponge, developer, or Tabloid or other dry chemicals, fixing bath in half-pounds, and the towels for wrapping and drying.

Your request and a three-cent stamp will bring you pamphlets describing much of the above equipment, all of which is obtainable from your dealer. The total cost, exclusive of the chemicals and the carrying bag, is less than $10.50 if we allow $5.00 for the tank. Some of the bakelite tanks cost less, and a good cut-film tank will make the total higher. The outfit may, however, prove worth many times its cost in saved pictures, and the development of the negatives with the definite knowledge of the results that seeing them gives us will make it worth our while both to assemble the equipment and to carry it with us. Ours has.

Enlarging Tricks

Once in a while we put into the enlarger a negative that has in it exactly what we need for our picture. The dark tones are deep enough and so placed as to keep us well in the picture, and the high lights are bright but not too much so. A straight print satisfies us. Once in a while this happens, but not often. Practically always we need a little more color here or less there, and we resort to printing-in with a card with a hole in it to add to the tone, or we use the whole card to mask off all but a corner that needs perhaps twice the exposure of the body of the print to make it look better, or we dodge some part with the torn paper on the wire to make the exposure less in that area.

Usually such procedure will result in a satisfactory print, but sometimes the areas to be altered are too small to permit our using these methods that are intended chiefly for big sections of the print. One school of amateurs immediately makes these changes by means of a paper negative—a subject that is too detailed and inclusive for this page at present—on which one can change any values in either direction. Other workers attempt to make the alterations on the print itself with reducers and chalking—two subjects that we shall consider later. Still others retouch the negative, a method that requires an expert and experienced hand.

A simple means of making the print fit our ideas better is to attach the negative to a ground-glass and do our retouching on the glass without danger of injuring the negative itself. A glass plate, perhaps a negative that

has been cleaned thoroughly, about the size of the negative, is covered with ground-glass substitute. This is trickier than it sounds. The glass is held from the bottom by the fingertips of one hand while a small puddle of the liquid is poured onto the center of the glass. The glass is tilted to let the liquid run to the edges of the glass without allowing it to run back on itself any more than is necessary. After the entire surface is covered, a further tilt toward one corner lets the surplus liquid run off the corner into the bottle. A little practice will result in a smooth surface that will "take" the lead of an ordinary soft pencil. We have found it advisable to coat several pieces of glass at one sitting when the knack seems to be with us. The coated glass is bound to the negative with the back of the negative against the uncoated side of the glass. We then view the combination by *transmitted* light and work in the

WASP TAKEN WITH A KORELLE-REFLEX THROUGH 8-INCH EXTENSION TUBE

high lights slowly and carefully with the pencil.

When large areas need to be held back, they may be darkened with chalk rubbed gently onto the rough surface with a bit of cotton. It is better to make a test print before we darken things too much, or we may carry it so far that we have to remove some of the lead or chalk to gain the proper balance of tones. The combination is put into the enlarger, and the print made through both the negative and the glass. On occasion, we have seen the whole negative except the few parts that needed to print darker covered with the chalk, and the high lights made even heavier with more penciling. Naturally, this system will not be satisfactory for tiny negatives, but it works wonders with larger ones, and as many prints as desired may be made alike—a thing that is difficult when the dodging and printing-in are complicated.

If this kind of control does not seem desirable, we can make the best print we can in the enlarging, and then change its values after it is ready to dry. The high lights should be worked up first with a very dilute Farmer's Reducer which consists of 5 grams of potassium ferricyanide and 10 grams of hypo crystals dissolved in 400 cc of water. Each chemical should be dissolved separately in part of the water and the two solutions poured together just before use. The wet print is wiped dry with a viscose sponge where the work is to be done and the reducer is applied with a bit of cotton on a matchstick. Only a little is put on at a time and it is not allowed to remain for more than a minute at a time. After the minute, wash off the chemicals with running water, and repeat the operation. The action will be slow, but this is desirable. If it were fast, we could not control it. Some practice is necessary, but the operation is simple, though it takes some time to do it well. When the high lights suit us, the print is washed for ten minutes, as when it came from the hypo, and then dried.

This has lightened some areas and we have probably brightened many fairly large parts of the picture by spreading the reducer over them. If the whole seems too dark, we may fill a clean tray with the solution and reduce the entire print. Remove it from the reducer a little before it looks right and stop the action with plenty of running water as quickly as possible because the reducing continues until the chemicals are diluted by the water. All through the process, it is well to experiment on worthless prints until the method is understood. Farmer's Reducer increases the contrast a little, so we may use it sometimes to save a print that was overexposed in the printing and is flat. Remember that ferricyanide is a deadly poison, and be careful with it.

Later we shall take up the subject of chalking the print to darken it as and where we wish. In the meantime, we would appreciate your telling us just what subjects are of special interest in this part of Camera Trails.

This and That

A new 24-page pamphlet has been issued by E. Leitz, Inc., of 730 Fifth Ave., New York City, describing the applications of Leica cameras. It will help all those who are interested in miniature cameras. Ask for Pamphlet No. 7784 when you write for your copy.

* * *

For the dark-room worker who is tired of sticking paper into envelopes between exposures, there is a box into which the whole package of paper may be put without danger of spoiling any of it when the enlarger or room lights are turned on. The 8″ x 10″ size is the only one now available, but larger sizes are in production and will be ready soon. The maker is the R. P. Cargille Company of 118 Liberty Street, New York City, who has a pamphlet describing the "Lock-Sharp", as it is called, for all NATURE readers. Please remember to mention this department.

* * *

Photo Utilities, Inc., of 10 West 33rd Street, New York City, have two new pamphlets. One describes a varied line of tripods for all purposes and the other the Utilo filters and sun-shades, accessories necessary to every photographer. Write for your copy of each of these valuable booklets.

* * *

Sometimes it is a bit confusing to determine just what effect on our exposure the addition of a filter will be. Filters are usually rated with "factors", listed as "x2" or "x4". This simply means that the filter will absorb so much of the light that we must lengthen the exposure with the original diaphragm opening or open the diaphragm wider with the same length of exposure in the same amount as the filter factor; in other words, we multiply the original exposure by the factor. That is, for an "x2" filter, we must either give 1/50th of a second at the aperture that would need 1/100th without the filter,

(Continued on page 229)

Action
Action in the fotographic world, hints to help you make better pictures, camera gossip, hundreds of low-priced bargain items covering the entire field of cameras and equipment! Where? . . . In the pages of the FOTOSHOP NEWS. A postcard to Dept. D10 brings you a FREE copy each and every month. Write today.
The FOTOSHOP
18 EAST 42ND ST.
NEW YORK

KORELLE-REFLEX—
The All Purpose Camera
Fast Lens
Reflex Focus
Seven cameras in one. It has many exclusive features. Focal Plane shutter, lenses interchange, 12 negatives 2¼x2¼ on 120 film. Don't buy till you see the Korelle. Catalog NM3 FREE.
Burke & James, Inc. 225 W. Madison St. CHICAGO, ILL.

● Out through the Land of Glamour, to impressive, magnificent, man-made Treasure Island rising from the sea . . . back through Nature's vast Wonderland of giant forests, mighty mountains, glorious waterfalls and rippling streams . . . what a veritable storehouse of pleasant things to remember.

Rock Island takes you on this interesting and exciting circle of ALL the West at *no extra fare*. Well-appointed, air-conditioned trains daily from Chicago.

Rock Island

All-Expense Tours are the Economical, Carefree Way. Ask about them. Mail the coupon today.

W. J. LEAHY, Passenger Traffic Manager
Rock Island Lines
723 La Salle Street Station, Chicago, Illinois

Send complete travel information concerning: ☐ San Francisco World's Fair ☐ All-Expense Tours.

Name_____

Address_____

City_____ State_____ 2559

BRANCH LIBRARY No. C. P. L.

NATURE MAGAZINE

PUBLISHED BY THE AMERICAN NATURE ASSOCIATION
To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

IN THIS ISSUE

Camera Trails . . . . . Norris W. Harkness 178
Indoors and Out . . . . . Howard Zahniser 183
Bird Songs, East and West . . Edmund J. Sawyer 185
The Screw Bean . . . . . David J. Morris 188
The Little Silky Anteater V. Wolfgang Von Hagen 189
Spiders (Poem) . . . . . Marie E. Kruse 190
Wild Life in Baffinland . . . . John Ripley Forbes 191
Lament for Binker, Her Misdeeds (Poem) Nanita MacDonell Balcom 193
Australia's Bronze-wing . . . . . Carl Naether 194
The Fourth North American Wildlife Conference Richard W. Westwood 195
Koala Adorns a Stamp . . . . . Edith M. Laing 197
Lady Slippers Reign as Queens Caroline Iverson 198
When Vacation Comes 201
Some Common Reptiles . . . E. Laurence Palmer 205
Birds in Hand 213
Conservation Editorials 217
The Skids Are Greased . . . Arthur Newton Pack 219
Things to Think About 222
Native Trees for Home Use . . . . . Victor H. Ries 224
As the Storm Rides In (Poem) Lillie Soullard West 226
The Discovery of a New Comet . Isabel M. Lewis 227
The School Page . . . . . E. Laurence Palmer 230
The Dog Column . . . . . Diana Thorne 234
Under the Microscope . . . Julian D. Corrington 238

NATURE MAGAZINE, PAST AND PRESENT, IS INDEXED IN THE READER'S GUIDE IN YOUR PUBLIC LIBRARY

U. S. AND CANADA
ONE YEAR $3
FOREIGN . . . $1 EXTRA
TWO YEARS $5
LIFE $100

A. B. McClanahan, Advertising Manager

ADVERTISING OFFICES
New York—295 Madison Avenue
Washington, D. C.—1214 16th St.
Chicago—203 N. Wabash Ave.
Los Angeles—Western Pacific Bldg.
San Francisco—Mills Bldg.

NATURE MAGAZINE is published monthly, October to May, inclusive, bimonthly, June to September, inclusive, by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C. Additional entry at Greenwich, Conn.

Publication and Editorial Office, 1214 16th Street, N. W., Washington, D. C. Additional Office of Publication, Greenwich, Conn.

Copyright, 1939, by American Nature Association
Title Registered U. S. Patent Office

THE ASSOCIATION

ARTHUR NEWTON PACK . . . . . President
Abiquiu, N. M.

RANDOLPH G. PACK . . . . . Vice-President
Darien, Conn.

RICHARD W. WESTWOOD . . . . . Secretary
Washington, D. C.

JAMES A. O'HEARN . . . . . Treasurer
New York, N. Y.

HARRY E. RADCLIFFE . . . . . Business Manager
Washington, D. C.

DR. E. LAURENCE PALMER . . . . . Director, Nature Education
Cornell University, New York

THE MAGAZINE

ARTHUR NEWTON PACK . . . . . Editor

RICHARD W. WESTWOOD . . . . . Managing Editor

EDWARD A. PREBLE . . . . . Associate Editor

R. BRUCE HORSFALL . . . . . Artist

HARRY E. RADCLIFFE . . . . . Business Manager

SCIENTIFIC CONSULTING BOARD

DR. LELAND O. HOWARD
Retired Chief, U. S. Bureau of Entomology

DR. WALDO L. SCHMITT
Curator of Marine Invertebrates, U. S. National Museum

DR. HARRY C. OBERHOLSER
Senior Biologist, U. S. Biological Survey

W. L. McATEE
Technical Adviser, U. S. Biological Survey

C. W. GILMORE
Curator of Vertebrate Paleontology, U. S. National Museum

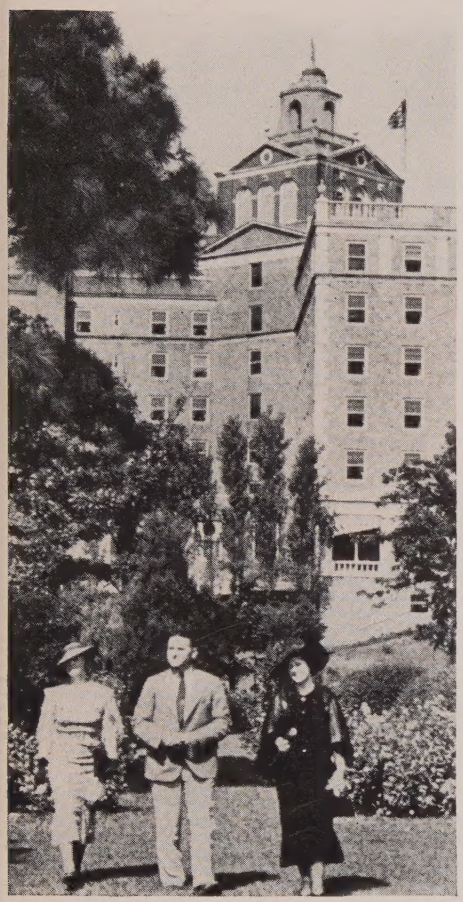
VERNON BAILEY
Retired Chief Naturalist, U. S. Biological Survey

DR. PAUL BARTSCH
Curator of Mollusks, U. S. National Museum

DR. EDGAR T. WHERRY
Wild Flower Preservation Society

DR. WILLIAM M. MANN
Director, National Zoological Park

IT'S SPRING NOW AT THE CAVALIER



The Cavalier's gardens are one of the show places of Virginia, visited by thousands during Garden Week in April. Favored with the warming influence of mild sea breezes from the nearby Gulf Stream, many plants, shrubs, and delicate flowers that are not often seen in so northern a clime are nurtured in the protected sunken gardens. Camellias, azaleas, gardenias and other exotic blossoms are plentiful at the Cavalier in their season. The formal gardens are designed after the most famous of the early colonial estates. At all seasons garden lovers find floral beauty in the well-kept Cavalier gardens.

The clientele at the Cavalier is carefully selected, assuring you of congenial fellow guests.

Write for additional information, tariff and reservations.

The Cavalier
Hotel and Beach Club
Virginia Beach
Roland Eaton
MANAGING DIRECTOR

Cornell Leaflet

What's the Difference? is the title of the January, 1939, Cornell Rural School Leaflet. A clue to its contents is found in the statement: "Taste, smell, and sight tell that things differ; yet things may taste alike, smell alike, or look alike, and still be different. For example, there are plenty of colorless liquids. Alcohol, water, turpentine, gasoline, sweetened water, and salt water in separate bottles may look so much alike that they need another test to be distinguished from one another. Most persons who wish to know how things differ first look at them, then smell them, and, if they are rash or inexperienced, may taste them." The succeeding discussion goes into the field of chemistry—which has not been frequently covered in the Leaflet series—and lays down certain fundamentals and suggests various fascinating avenues of thought. Available free to citizens of New York State, these leaflets may be obtained by others by subscription. Write to New York State College of Agriculture, Cornell University, Ithaca, New York, for information.

Michigan Biological Station

The thirty-first session of the University of Michigan's Biological Station will be held on the shores of Douglas Lake, Cheboygan County, June 26 to August 19. The usual distinguished faculty has been retained for this summer session. Enrollment is limited to 120 students. Space here does not permit detailed discussion of the outstanding opportunity offered by this camp session, but full details and an application for admission may be obtained by writing to George R. LaRue, University of Michigan, Ann Arbor, Michigan.

Appropriate Sentence

Out of season, eighteen-year-old Woodrow M. Conner of Florence, Oregon, shot two wild ducks. He was brought into court before Justice of the Peace C. M. Severy and pleaded guilty. Considering the young man's age and financial circumstances, the judge pronounced a wise sentence. Conner was to study game birds in the local library, report to the Justice at intervals and cap his study by giving a lecture to local high-school students about game birds.

Mammalogists to Meet

The annual meeting of the American Society of Mammalogists will be held in Baton Rouge, Louisiana, April 3 to 7. One feature of the meeting will be a trip through the famous Teche country, the home of Longfellow's Evangeline, culminating at the estate of Edward A. McIlhenny.

Dr. Murphey's Poems

Lovers of Nature poetry will revel in *Wings at Dusk*, a collection of poems about birds by Dr. Eugene Edmund Murphey. A practicing physician and eminent ornithologist, he is equally a poet of the modern school, able to translate his knowledge of and love for birds into lyric terms. Published by Longmans-Green and Company, this little volume sells for two dollars.

2 Extra Vacation Days in COOL COLORADO

When you ride the

DENVER ZEPHYR

● Colorado—an ideal vacation spot, nestled in the invigorating Rockies. The DENVER ZEPHYR—the ideal way to get there.

This distinctive, streamlined train, diesel-powered and built of gleaming stainless steel, whisks you from Chicago to glorious Colorado—just overnight. Its speedy 16-hour schedule gives you two extra days in which to enjoy Denver and its mountain parks, enchanting Colorado Springs, majestic Pikes Peak, Boulder and the alpine beauty of Estes Park.

Burlington's summer fares are amazingly low. You'll be surprised how little a vacation in Colorado will cost.

In addition to the ZEPHYR, the ARISTOCRAT and other fine, air-conditioned steam trains from Chicago and St. Louis to Denver.

Travel independently or join a *Burlington Escorted Tour* with everything arranged in advance, relieving you of every travel detail. Either way, Burlington gives you the greatest travel value. Mail coupon for illustrated booklet and information.

GOING TO SAN FRANCISCO WORLD'S FAIR?

Cool Colorado is right on the way. Enjoy a visit in this enchanting playground. Thence, through the heart of the glorious Colorado Rockies and the spectacular Feather River Canyon—to the Coast. Magic daylight hours over one of the country's most scenic routes.

Burlington Route

Way of the Zephyrs

---MAIL THIS COUPON TODAY---

Burlington Travel Bureau, Room 1640
547 W. Jackson Blvd., Chicago, Ill.

Send me your free illustrated booklets, rates and information about Colorado Vacations.

Name_____

Street and Number_____

City_____State_____

☐ Check here for special information about All-expense Escorted Tours

Big *in* Value

. . . Little *in* Cost

FEW things give you so much convenience, happiness and security —all rolled into one—as your telephone.

Telephone service is not only exceptionally good—it's cheap. Nowhere in the world do people get so much service and such good service at such low cost.

Experienced management, trained people and good equipment are three important reasons for this fact.

BELL TELEPHONE SYSTEM

YOU ARE CORDIALLY INVITED TO VISIT THE BELL SYSTEM EXHIBIT AT THE NEW YORK WORLD'S FAIR

Indoors and Out

By HOWARD ZAHNISER

WHEN April comes the phoebes return from the South and bring remembrances of John James Audubon.

Early one April when Audubon was approaching the natural bridge in Virginia for the first time, his companion, who had been there before, proposed a wager that he could lead Audubon across the bridge unawares. To his friend's great surprise, Audubon won the wager. He simply listened to the notes of the different birds, and when he heard the phoebe he knew that "a cave or a deep, rocky creek was at hand."

In an earlier April Audubon had made the phoebe—or the pewee flycatcher, as he called this bird—the subject of an intensive study that included the first "banding" of an American bird—a form of bird study that has become so intensive now that cooperators of the U. S. Biological Survey have placed considerably more than eight thousand bands on eastern phoebes alone since 1920.

It was in 1804 that Audubon made his early study of the phoebe—the same spring in which he met Lucy Bakewell, whom he married in April of 1808. "Other ruddy cheeks and bright eyes," he later wrote for his sons, "made their transient appearance, but like spirits gay, soon vanished from my sight." Lucy Bakewell is as abiding as Audubon himself, and she shares with him praises that seem still to be increasing.

Stanley Clisby Arthur says in *Audubon: An Intimate Life of the American Woodsman* (Harmanson, New Orleans, $5): "When the young man just emerging from his teens . . . bowed low to the ruddy-cheeked English girl sewing by the open fireplace, his position in the world of famous men became assured—for had it not been for Lucy Bakewell, you and I might never have heard of a man named Audubon." And Francis Hobart Herrick says in his biography of Audubon: "This event must be regarded as the most auspicious in his career, for in all probability the world would never have heard of Audubon had it not been for the spur to his ambition and the balance wheel to his character which came through his admirable wife."

Surely there are not many now who have not heard of the name of Audubon. A mountain in the Rockies, a bust in the Hall of Fame, a statue in New Orleans, and parks and streets carry his name. A national organization makes his name synonymous with conservation. All of this derives in many direct and subtle ways from the influence of Lucy Bakewell. Dr. A. K. Fisher tells in the January, 1939, issue of *The Auk* an important memorial story of George Bird Grinnell that includes a tribute to Lucy Bakewell and evidence of her contribution to Audubon's fame. Grinnell never knew the artist and naturalist, but he went to school to Mrs. Audubon and received from her his first serious lesson on birds. When he founded the first bird-protective organization in this country, in 1886, he called it "The Audubon Society." Who knows to what extent the name of the National Association of Audubon Societies is a tribute to Lucy Bakewell?

Even disregarding tributary uses of the name, one could hardly imagine that there are very many readers at least who are not fairly familiar with Audubon's story. Francis Hobart Herrick has recently published a second, one-volume edition of his standard, indispensable work with 118 illustrations including 4 of Audubon's plates in color (*Audubon the Naturalist: A History of His Life and Time,* D. Appleton-Century, $6), and he says in the preface: "No less than ten volumes about, or by, Audubon have appeared during the past twenty years, or since the publication of *Audubon the Naturalist* in 1917, and three of these are more or less extended biographies." The new works have even included a complete edition of Audubon's bird portraits (*The Birds of America,* Macmillan, $12.50). The grandeur of the great elephant folios is, of course, missing from this quarto volume, and many of the plates fall short of reproducing the original colors faithfully. But other plates are remarkably satisfying, many are equal or superior to Audubon's own "miniature" editions, and all show Audubon's remarkable designs and compositions. It is a welcome volume in any library. Audubon's patrons are still increasing.

But it has been many years since a new edition of Audubon's own writings about birds and mammals has been issued. No edition now can even be read in the Library of Congress outside the rare book room. And having recently read five different biographies of Audubon, I myself feel like suggesting that the next publisher's project on Audubon be devoted to making his own writings more widely available.

This brings me back from the digression that began with the mention of Lucy Bakewell in that spring of 1804 when Audubon studied the phoebe's nest along the Perkioming Creek in Pennsylvania. It was Audubon's own account of the phoebes (or pewees, as he called them) and his pioneer bird-banding that I wished to introduce:

"It was now the 10th of April; the spring was forward that season, no more snow was to be seen, Redwings and Grakles were to be found here and there. The Pewees, I observed, began working at their old nest. . . ."

"The female one day spent the greater part of the time in her nest; she frequently changed her position; her mate exhibited much uneasiness, he would alight by her sometimes, sit by her side for a moment, and suddenly flying out, would return with an insect, which she took from his bill with apparent gratification. About three o'clock in the afternoon, I saw the uneasiness of the female increase; the male showed an unusual appearance of despondence, when, of a sudden, the female rose on her feet, looked sidewise under her, (Continued on page 237)

ALTHOUGH IT IS IMPOSSIBLE TO LIST THE SPRING ARRIVALS IN ORDER OF THEIR COMING, THIS YEAR IT MAY BE A ROBIN